Babcock & Wilcox Canada

A History

1844-1977

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*This book is
dedicated to the
thousands of employees
of the Company
who,
over the past 143 years,
have contributed their
efforts and energies
to the Company's growth
and development.*

CAMBRIDGE, ONTARIO
AUGUST, 1987.

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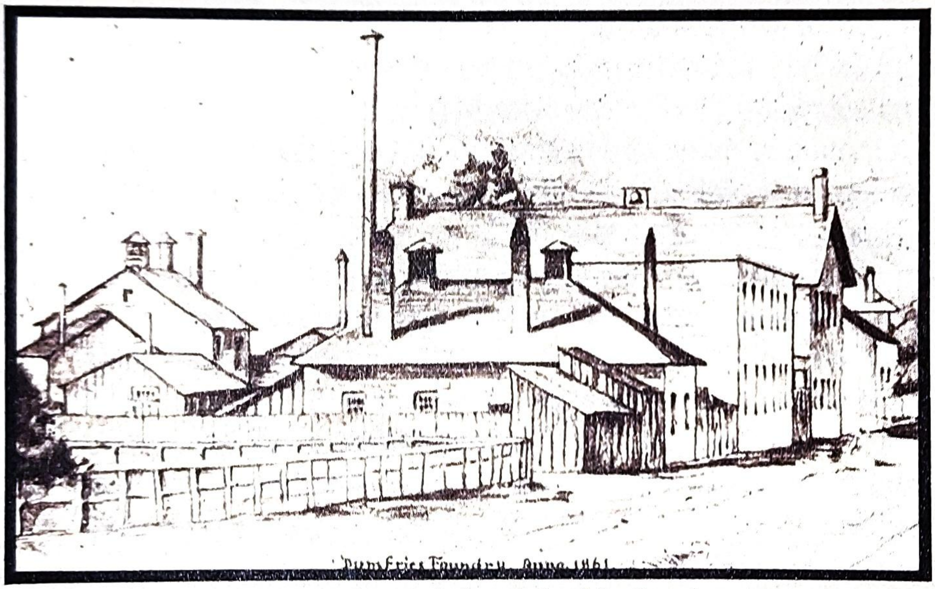
CHAPTER
1

1844-1859



An artist's 1861 rendering of Dumfries Foundry.

DUMFRIES FOUNDRY

The Scots played an important role in the development of what is now southern Ontario. Many immigrated to the area because much of southern Ontario was settled in the early 1800's and the early 1800's were not a happy time in Scotland. The Second Industrial Revolution in Scotland (1800-1850) treated many Scots unkindly, and immigrants to the New World consisted of both dispossessed Highland crofters looking for farmland they could call their own and unhappy Lowland tradesmen and artisans hoping to establish a better life for themselves in the frontiers of the New World. Of the four individuals who could be called the founders of Babcock & Wilcox Canada, three of them (James Crombie, John Goldie, and Hugh McCulloch) were Scotsmen by birth, and the fourth (James Andrews), about whom little is known, immigrated to Canada from America but had a name that contributes strongly to the suspicion that he was Scot by birth or ancestry. It was the chance association of Andrews and Crombie in Galt (now part of Cambridge, Ontario) in 1844, the seventh year of Queen Victoria's reign, that led to the formation of the Company.

The town of Galt, in the township of Dumfries, was itself only founded in 1816. It was in that year that Absalom Shade, a young carpenter from Buffalo, New York, began carving a homestead and mill out of totally unbroken forest on the east bank of the Grand River on the site of what is now Galt. The land was owned by William Dickson who encouraged emigrants from his native Scotland to settle in the area. Dickson's agent in Scotland made special efforts to recruit people with useful skills such as blacksmiths, carpenters, masons, tanners, and millers. By 1818 the population of the town had grown to 63, and by 1834 the population had increased to 250.

James K. Andrews was brought to Galt in late 1816 or early 1817 by his mother and his stepfather, Absalom Shade.

By 1834, Andrews was operating a grist mill in the town and by 1843, when the 25 year old James Crombie arrived in town, Andrews was already a well established merchant. Through some sequence of occurrences that is now lost to us, Crombie and Andrews decided to go into partnership together and establish a foundry. The foundry that they started commenced casting in 1844, and this is generally taken as the year of the founding of Babcock & Wilcox Canada. For many years, certain stationery of the Company bore the inscription "Established in the year 1844".

The exact location in Galt of that first foundry is a matter of some uncertainty. Various accounts over the years have described it as "just to the south", "behind", and "immediately north" of the Dumfries Mills.

The Dumfries Mills were, at that time, located approximately on the site of what is currently the Armory in Galt.

A 1974 article in *The Cambridge Reporter* further confused the issue by describing the structure at 50 Ainslie Street (presently Bairo's Supermarket) as the original foundry. In his 1880 book, *Reminiscences of the Early History of Galt and the Settlement of Dumfries,* James M. Young, who had lived in the town for many years and whose book appears quite meticulous in many other details, describes the Dumfries Foundry as "...first situated on the north side of Mill Creek, immediately south of Dumfries Mills...". This would place the foundry at the approximate location of what is currently the Newlands Mills at 31 Ainslie Street. This location would also agree with *Picturesque and Industrial City of Galt* which was published in 1928, and which describes the original site of the foundry as being the current site of Newlands Mills. Currently existing property records in Cambridge do not show any record of Crombie or Andrews owning any land at this location in 1844, and it can only be conjectured either that Andrews's stepfather, Absalom Shade, who owned the property, allowed the two partners to use the land or that the property records are lost since title records were only just starting to be kept at this time.

The only map to survive from this era is Marcus Smith's map of 1851. This map shows a structure labelled "Halton Mills" immediately south of the Dumfries Mills and just south of that (but still north of Mill Creek) an unlabelled building which may have been the original foundry. This building is approximately on the Newlands Mill site. This interesting old map also shows the name James Crombie on a property on the south side of Mill Creek at 101 Ainslie Street, currently the site of the Maloney's Restaurant. A search of property records shows that Crombie bought this property from Absalom Shade in 1855. It can only be speculated that Crombie used this property for a residence or to support some other enterprise, but it was not the original foundry site since it was south of Mill Creek. There are some remnants of an old structure behind Maloney's Catering and Restaurant (formerly Stauffer-Roos Fuel Company property), but it is not clear whether they are remnants of the Crombie building shown on the 1851 map or a later structure.

But what about the 1974 *Cambridge Reporter* claim that 50 Ainslie Street was the original site of the foundry? A check of property records reveals no ownership by Crombie, Goldie and McCulloch, or any other interest associated with the Company, making it unlikely that this was the site of the original foundry. The present investigators are, therefore, convinced that the original site of the Dumfries Foundry was approximately the site of the current Newland Mills, and until such time as someone can produce good evidence to the contrary they will remain of that conviction!

A detailed history of the Drumfries Foundry during its early years is difficult to reconstruct since Babcock & Wilcox Canada has no records going back that far and the public records of that era are sketchy. One of the best sources would normally be the local newspapers, but unfortunately the early files of *The Galt Reporter* were lost many years ago. The Cambridge Public Library has preserved the complete files of *The Galt Reporter* and *The Dumfries Reformer* (the then local newspapers) from 1857. Only isolated copies of the pre-1857 Galt Reporter are known to exist.

It is known that when Andrews and Crombie established the foundry in 1844, the town also contained two other foundries, an axe and edge tool factory, a paper mill, two woolen mills, a steam-powered wagon factory, a sash and door factory, a carriage shop, and an accumulation of furniture factories, planing mills, and flour mills. James Young, *op. cit.,* quotes the October 4, 1845 issue of *The Courier* (a local newspaper that lasted about two years) as follows: "Jas. Crombie & Co. wish to dispose of threshing machines, stoves, etc. at the foundry adjoining Dumfries Mills." Two things are interesting about this notice. First, it is curious that the Company was referred to as Jas. Crombie & Co. since Andrews is believed still to have been active in the partnership. A variety of evidence makes it appear that the names "Jas. Crombie & Co." and "Dumfries Foundry" were used interchangeably throughout the period 1844-1859. The name "Dumfries Foundry" can be found on letterheads and receipts of the company until at least 1891, and the name appears there along with the names Goldie and McCulloch long after the latter gentlemen had acquired the firm. The second interesting point in the above quote from *The Courier* is that it would appear that the new partnership of Crombie and Andrews either did some manufacturing beyond just foundry work, or that it dealt in new or used equipment built by others.

Shortly after the foundry was established, its increasing volume of business and improving prospects required relocation of the firm to more suitable quarters. In 1847, the Company was relocated to West Main Street (now Grand Avenue South) on the west side of the Grand River. These properties were only sold by the Company in 1986 and 1987.

Another hint about products of the Company can be found in Adam Ainslie's autobiography which was written in the summer of 1889. Ainslie, who resided in Galt for a number of years, describes in his autobiography the building of his house in Galt which appears to have occurred sometime during the period 1848-1850 (Ainslie's account is sadly deficient in dates). Describing his house, Ainslie says:

> *...one corner was carried up in large dimensions so as to give room for a* safe *to keep my deeds and papers in. James Crombie, who had some years before erected a foundry on the west side of the river, fitted in an iron door and Wm. Ferguson lined the interior with sheet iron.*

It would appear then that even at this early date, thanks to some special skill or knowledge on the part of Crombie or one of his employees, the Company had some facility in the manufacture of safe doors. Safes and safe doors were for many years a major product line of the Company.

Although the record is somewhat unclear, it appears that Andrews remained a partner in the firm for several years after its relocation to West Main Street. Crombie's obituary states that, "Financial embarrassment caused Mr. Andrews to retire, and the business passed wholly into the hands of Mr. Crombie." It is estimated that this took place in approximately 1850, at which time Crombie was 32 years old.

The company appears to have met with some success under Crombie's management, and its activities were described as follows in the May 3, 1854 issue of *The Dumfries Reformer* under the heading "Engine Building in Galt". The reader should keep in mind as he reads this article the degree of sophistication required to build the products described, that the Company had only been established ten years earlier, and that Galt was still a fairly remote outpost with a limited base of technology.

> *The thing that makes a town is what it can do — what it exports, or in other words, what it manufactures and sends abroad. A recent visit to the celebrated foundry establishment of Messrs. Crombie & Co. of this town, amply convinced us of this fact. Here amid the busy din and constant whirl of swift machinery, are forged, fashioned, and finished, an endless number of substantial articles of worldwide utility, displaying alike the progressive character of mechanical talent, and the credit wealth and renown which attend untiring diligence and laudable perseverance. No less than seventeen engines are in various stages of progress in this establishment at this moment, and more orders are pouring in than the enterprising proprietors can possibly execute, notwithstanding a great increase of hands and extra hours of work! But the most prominent and attractive monument of skill now to be seen in the finishing room by visitors, is a large engine on the horizontal system, of forty horse power, intended for Mr. Williams [railway] Car Factory, Hamilton. All the patterns were got up expressly for this dainty giantess, by the aforesaid firm. It presents a very massive appearance with much polished brass and clear work of first-rate character. It is also fitted with Stevenson's patent cut-off for working steam expansively, to which are added some ingenious improvements by Mr. Andrew Scott, the presiding spirit of the practical department. The fly wheel alone weighs over three and a half tons, and altogether will well repay the curious for a visit.*

In 1855 the Great Western Railway built a branch line into Galt and in the same year the Galt & Guelph Railway was extended as far as Preston. With this added facility, Galt became known as the "Manchester of Canada" and Mr. Crombie's enterprise found itself well located since it could now take advantage of the railways for transportation of the heavy equipment manufactured by the company. During this period there was another important influence on the economy of Canada West (Ontario) which greatly stimulated industrial growth and aided the growth of Crombie's company: Great Britain became embroiled in the Crimean War in 1854. Since the mother country was preoccupied with the manufacture and supply of war materials, the colony was thrown on its own resources and had to satisfy its own demand for manufactured goods. The opportunity to export some of its products to Great Britain also presented itself, with a resulting industrial boom in Galt and in other industrialized parts of the province.

Among "the great increase of hands" referred to in *The Dumfries Reformer's* report on the Dumfries Foundry, were two young Scotsmen whose families had settled near Galt in the villages of Greenfield and Ayr: John Goldie and Hugh McCulloch. Goldie and McCulloch were to play a vital role in the direction and management of the company over the next five decades.

Hugh McCulloch was born in Ayrshire, Scotland in 1826 and came to Canada in August, 1850. He lived in Ayr for a short time before moving to Galt in 1851, where he entered the employ of James Crombie on May 8 of that year.

By the time he arrived in Galt, McCulloch's partner-to-be, John Goldie, had a wide variety of valuable experience. As a boy in Scotland, Goldie left school early, was apprenticed to a millwright, and worked on the building of the railway between Ayr and Glasgow. In Canada, he worked as a pattern maker for a year and a half in Montreal. Returning home to Greenfield, he set up a small machine shop and later shared the ownership of a sawmill. For a while, young Goldie worked as a millwright for James Crombie, but left Galt in 1855 to go into partnership with his brother-in-law. They started a sawmill near Acton, which they operated for three or four years. Later he returned to Galt and to the Dumfries Foundry. Goldie and McCulloch, frugal and enterprising Scotsmen that they were, combined their resources and in a move that was to determine the course of the firm for the next 60 years, they bought the Company from Crombie in 1859.

The Company currently has in its files the handwritten pen and ink originals of the documents related to the purchase of the Company by John Goldie and Hugh McCulloch. The documents were executed in the law offices of Irving and Ball on August 8, 1859. Included are the bill of sale (to include the inventory), the bonds, the statement of payments, and articles of agreement. The Company was bought by Goldie and McCulloch for the sum of $50,000 with a $4,400 down payment and equal payments on principal of $3,040 due on January 1 of each year from 1861 through 1875. The record also shows that these payments were made as agreed except that the amounts of $3,280 and $2,260 were paid in 1871 and 1872 respectively. Interest was included in each annual payment at the rate of 6% on the unpaid balance.

For this sum Goldie and McCulloch acquired "one main building on lot 54, north side of Malcolm Street with all buildings thereon. One acre between Malcolm Street [now closed] and Forbes Street [now Fraser Street], with buildings and fencing". They also acquired stock consisting of tools, patterns, horses, harness, sleighs, and wagons.

A sketch dated 1861 shows the buildings of the Foundry as it is believed to have been when the partners acquired the Company: four small but fairly substantial buildings together with several shack-like out buildings.

The Foundry had twenty-two workers at the time. Mr. Crombie "retired" but continued a business career which was at times highly successful, but eventually ended in near ruin as a result of speculation in the Chicago grain market. H. L. McCulloch, grandson of Hugh McCulloch Sr., stated in 1987 that when Crombie sold his foundry, he expected that the young buyers would soon fail, and that the business would come back on his hands at a fraction of what he sold it for. However, it turned out that this was not to be, and the company continued to grow under the guidance of Goldie and McCulloch.

CHAPTER 2

1859-1891

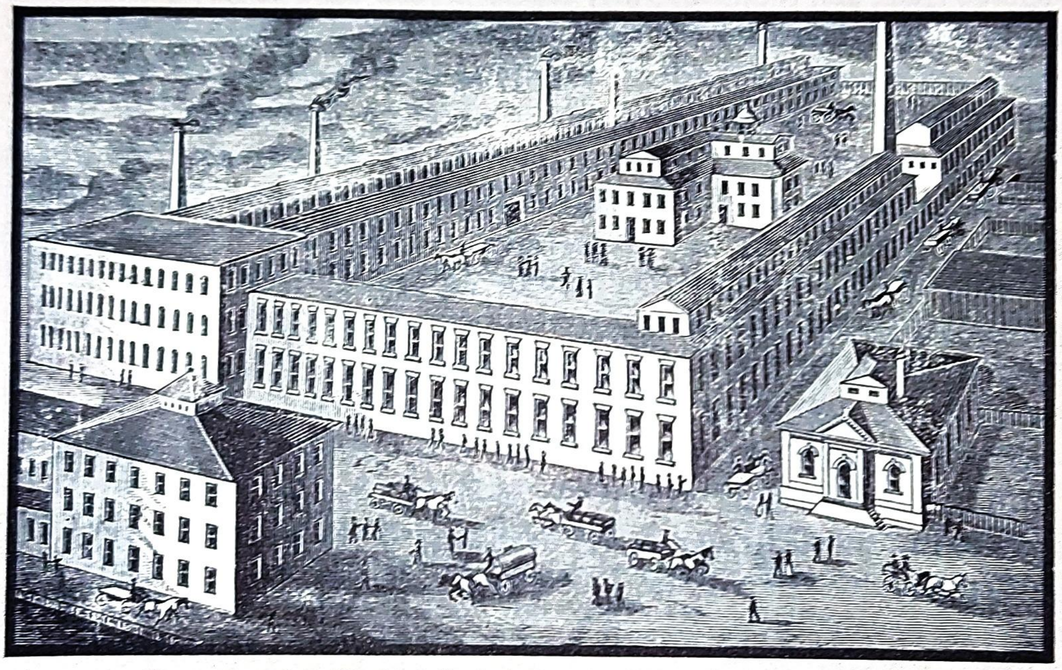


Illustration of Goldie McCulloch & Co's Foundry c. 1884 (South Works).

GOLDIE McCULLOCH & CO.

This chapter covers the period from the purchase of the Company by John Goldie and Hugh McCulloch in 1859 to its incorporation in 1891. During this period the Company existed as a partnership which was apparently rather loose in form initially.

By 1862, the Company had grown to the point that Goldie and McCulloch apparently felt that the time had come to formalize their partnership. This they did on March 28th, agreeing that: "...in consideration of the special trusts and confidence they repose in each other and in order to augment their fortunes and for other good causes and considerations them thereunto moving, have agreed to continue their partnership in the business aforesaid for the term and time...hereunder mentioned".

The "term and time" was ten years. The "said parties" promised "to each contribute two-thousand two-hundred dollars, which sums shall be the capital or joint stock of said partnership".

The name of the firm was to be "Goldie McCulloch & Co." and it was agreed that neither partner should "...draw out of the yearly profits...more than the sum of one thousand dollars for his own use and support". The new partnership at the Dumfries Foundry received its first large contract for machinery from the Great Western Railway's rolling mills in Hamilton. The contract kept the Foundry busy until 1864.

An advertisement which appeared in the *County of Waterloo Gazeteer and General Business Directory* for 1864 described the business and products of the Company as follows:

> *The Dumfries Iron and Brass Foundry, so long and successfully carried on by James Crombie, Esq. is well known throughout Western Canada [Canada West]. Messrs. Goldie, McCulloch & Co. are now the proprietors. The buildings are of stone, and very extensive, and although a large number of workmen are employed, the Foundry is taxed to its uttermost to supply its patrons. Its business consists principally in making steam engines, fitting up flour and saw mills, making French burr millstones, etc. The enterprising proprietors are just completing machinery for the new Great Western rolling mills in Hamilton – which was a very large contract. The machinery of the Dumfries Foundry has found its way to Cuba, California, and other parts of the world.*

The *County of Waterloo Gazeteer* for 1867 contains a Goldie McCulloch & Co. advertisement which shows that production had expanded. The "successors to James Crombie & Co." in a full page advertisement announced that they made "Water Wheels, including various forms of Overshot, Turbine and Central – Discharge;

> *Grist and Flouring Mills, with the most improved Forms of Smut Machines and other cleaning apparatus, ... Saw mills with steam or waterpower. Law's patent Shingle Machine and Wheel Jointer, Bark Mills and other Tannery Apparatus.*

The long list continues, citing all kinds of "Shafting and Mill Gearing"; "Flax Mills", "Woolen Machinery", and "Self-Acting Regulators". Also noted is a line of woolen machinery "Recently added to the business of this Establishment" which included carding machines, patent burring machinery, and numerous other types of woolen machinery. But the most interesting part of this ad lists "Steam Engines and Boilers for Mill and Factory purposes". This is the first known reference to boilermaking in the Company. Presumably, these were firetube and not water tube boilers. Notice that boilers were not mentioned in the 1864 *Gazeteer* advertisement, thus it is possible that the Company first entered the boiler business in the 1864-1867 period.

Also in this year, a large lot on West Main Street was added to the Foundry property.

It is interesting to note that in that same year, 1867, some 350 miles to the southeast, in New York City, an event had taken place totally unbeknownst to Messrs. Goldie and McCulloch that was ultimately to have a profound effect on their Company's fortunes. It was in that year that George Herman Babcock and Steven Wilcox formed the partnership that ultimately led to the company bearing their names.

The Galt Reporter of September 11, 1868 published an article on the Provincial Exhibition to be held in Toronto in which it was stated that Goldie McCulloch & Co. were preparing specimens of woolen machinery to enter in the Exhibition, including several machines "never before made in the Province, the Cloth Shears in particular requiring the getting up of special machines for their manufacture, and the machine itself is a specimen of the highest class of delicate and complicated workmanship".

A report in the December 21, 1899 issue of *The Galt Reporter* states that about 31 years ago (i.e. about 1868), the Company began the fabrication of safes. Safes continued to be a major product line of the Company until the safe operations were spun off during the partial acquisition of the Company by Babcock and Wilcox in 1923. Note, though, from the previous chapter that vault doors were known to have been in production as early as 1848-1850.

The Company's versatility may be judged by an item appearing in *The Galt Reporter* the very next day, to the effect that the necessary castings for "dumping cars for the Credit Valley Railway were being made at Messrs. Goldie & McCulloch's".

The Galt Reporter's enthusiastic editor wrote in August of 1869 that:

> *We learn with much satisfaction that the eminent firm of Goldie & McCulloch of the Dumfries Foundry, of this town, have under contract...the erection of a very large Mill on the Ottawa...From all parts of the Province, orders are now received at this Foundry, and in our country exchanges, in nearly all their notices of manufacturing improvements in their respective localities, bear testimony to the large business and high character for first-class work now possessed by the firm of Goldie McCulloch & Co.*

Such an expansion of trade must have put a great strain on the old foundry buildings and in 1870 extensive additions and improvements were made.

Lots 57 and 58 on the river side of West Main Street (now Grand Avenue South) had been purchased in March 1870, and in the same month the additions to the building, to cost $14,000, were begun. The following description of the proposed construction appeared in *The Galt Reporter:*

> *A range of shops for blacksmiths, boilermakers, millstone builders with a large store-house attached; also a stone store-house about 84 feet square, three stories high, to be built on a lot opposite the Foundry...Mr. R. Webster [of the Webster brothers who were the best stone masons in Galt] has the contract for taking down the inner wall of the entire range of machine shops, running along Malcolm Street – widening these out 24 feet and putting an additional story upon the height...The firm now employ [sic] close upon two hundred men. The new buildings – adding all of one-third to the present accommodation – will call for a large addition to this number...As soon as they [the buildings] are in working order the Woolen Machinery department will be expanded by making the manufacturing list include sundry important machines which lack of room has up to this time excluded from it. Of these, the most prominent will be Spinning machines, such as jacks and self-acting mules.*

The 84 foot square building described above is the limestone pattern storage building on Grand Avenue South. This picturesque three storey structure, surmounted by a cupola, has become something of a landmark in West Galt. The building has been unused for a number of years, and was sold by the Company in 1986.

The following year, 1871, the paper reported that the large new buildings were filled "with machinery, patterns etc. and resounded with the busy sound of hammers and whirling wheels. The capacity of the works is taxed to the utmost to fill orders, and should the press continue, additions will again have to be made". One of the "marvels" of the new works was a derrick or crane which had been made by Goldie McCulloch for its own use. This same article stated that the Company employed over 200 men and that overtime was being worked in almost every shop.

The year 1872 brought labor trouble, a rare problem in conservative Galt. The "Nine Hour Movement" had been gaining momentum throughout Ontario and having gotten wind of the desire on the part of the master mechanics to have their working day reduced by one hour from ten to nine, the employers of the province had drawn up a circular. This circular expressed their conviction that the results of the movement would be disastrous, increasing the cost of living, sending money out of the country to purchase goods which no longer would be produced in sufficient quantities at home, etc. The circular was endorsed and circulated by Goldie McCulloch & Co. The Company announced that its employees were to sign an agreement at the Office of the Works. The agreement was worded as follows:

> *I, the undersigned, agree to work for Messrs. Goldie, McCulloch & Co. of Galt, at my usual calling or trade, and will not in any way agitate or contribute percuniary aid to such as are agitating, for the reduction of the present hours of labor now constituting a day's work, while I remain in their employment.*

A meeting was called at the Fireman's Hall for May 13, 1872 by the men of the Foundry, at which the workmen disclaimed any part in the agitation for a nine hour day. However they felt that as "British subjects" they could not conscientiously sign a document that might "infringe on their rights and liberties". A delegation was appointed to wait upon their employers with this decision. The result was a lock out of some hundred employees at the Company.

A mass meeting was held the next evening, and another committee was dispatched to meet with the employers. The committee suggested the deletion of "the obnoxious part [of the circular] referring to the agitation of the Nine Hour movement and the part declaring that men should not contribute their money for a certain purpose" but the Company remained adamant. Rotating strikes had been threatened by the master mechanics and the manufacturers felt that "they might as well close down their establishments as give in on the issue".

By the following week, the trouble had been more or less settled. The obnoxious agreement was withdrawn and a more acceptable "rules of the shop" substituted. Three quarters of the men returned to work, only a quarter of the "oldest hands" refusing to do so. The newspaper did not report, however, at that time as to whether the nine hour day had been granted, but later accounts make it appear that the standard remained ten hours.

The year 1873 saw another expansion at the Foundry. The old tannery property next door was bought, the buildings were gutted, and a 60-horsepower steam engine was installed in the rebuilt structure.

Although this brief history does not allow a discussion in detail of the many types of industrial machines produced by the Company, one cannot help but be impressed when reviewing old catalogs by the diversity and complexity of these devices. Consider the following from the October 16, 1874 edition of *The Galt Reporter* (and note the reference to "an old Waterloo boy"!):

> **MACHINE FOR MAKING BARRELS**
>
> *A new patent machine for making Barrels is at present being built by Messrs. Goldie & McCulloch of this town, to the order of Mr. Philip Volmar, of Seaforth. The machine has been tried, both in the United States and Canada, and is capable of turning out from 500 to 1000 complete barrels in one day. The machine was invented by Mr. Greenwood, of Rochester, and is patented in both the United States and Canada, but by an arrangement with the patentee Mr. Volmar has secured the right to set one up in Seaforth, and it is now being manufactured, as above stated, at Goldie & McCulloch's. We hope to learn that Mr. Volmar is successful in this venture — more particularly as he is an old Waterloo boy, having resided in Preston for some 17 years.*

James Crombie, the founder of the Dumfries Foundry, died in 1876 just as he was embarking on another venture as manager of a large woolen factory in Preston. After selling his interest in the Company to Goldie and McCulloch in 1859, Crombie tried his hand at several business ventures and lived for a while in Hamilton.

An interesting historical footnote occurred in 1876. In that year, the Centennial Exposition was held in Philadelphia. This Exposition was largely technical in nature and included many technological devices such as boilers, steam machinery, and other equipment and machines. It was at that Exposition that Babcock and Wilcox Company in the US exhibited the now famous B&W Centennial boiler. An account of that display is given in the US Company's book entitled *Fifty Years of Steam.* It so happens that a review of the seven volume record of the Centennial Exposition reveals that Goldie McCulloch & Co. also exhibited equipment at the exposition. An entry on page 413 of the record states:

> *405. Goldie & McCulloch, Galt, Ontario, Canada*
>
> **TURBINE WATER-WHEEL AND STEAM ENGINE**
>
> *Report. Turbine water-wheel commended for excellent workmanship. The steam engine exhibited is of very substantial, solid character, and shows plain and careful workmanship.*

Fifty Years of Steam makes specific mention of a "mammoth Corliss engine". Could it have been Goldie and McCulloch's steam engine, or was it possibly exhibited by another manufacturer? Is it possible that Messrs. Babcock and/or Wilcox met Messrs. Goldie and/or McCulloch at the exhibit totally unaware of the future intertwining of their enterprises? Certainly they were interested in similar types of equipment and maybe they even discussed (debated?) their respective designs. One can only wonder.

In November 1876, an engine weighing about six tons was dispatched from the Foundry on a wagon drawn by two teams of horses. On the way to Bridgeport, this load partially broke through the Preston bridge, and the following account of the incident was given in the November 10, 1876 edition of *The Galt Reporter:*

> *Broke Through. Messrs. Goldie & McCulloch, of this town, shipped on Thursday last by team, drawn by four horses, an engine weight some six tons. The engine was destined for Bridgeport, and was taken across the Grand River on the new bridge lately constructed in this town without causing a shake. At Preston, however, it was not so fortunate, two of the main stringers breaking beneath the strain. At the moment of the break, Mr. Geo. Moffat was on the truck driving, and heard the timbers cracking; but the noise alarmed the horses, and they made a spring forward, thus probably preventing the truck, engine, driver and all, being dragged into the river. As it is, the damage to the bridge is not very great, but it has been closed to travel since, parties having to ford the river. It will fall on the County to do the repairs. A number of plank were afterward broken on the Freeport bridge by the same engine.*

Safes and vaults were an important part of the output of the firm by 1880, and a decision was made to expand this line when an important order was received from Ottawa. "The immense vault being built by Messrs. Goldie and McCulloch for the Post Office department of the Dominion" commented the *The Galt Reporter:*

> *...is being put together in the yard of the works, and will likely be completed about the end of June. When in position in Ottawa, it will form the interior of a massive stone building, so that there will be actually nothing save the contents for fire to prey upon. When completed it will be one of the finest vaults in America. The dead letters should be properly mummified in such a catacomb.*

Property was bought on Forbes Street in 1882 for a vault machine shop and a moulding shop, and in 1883 a lot was acquired on the river side of West Main Street for further expansion.

Eighteen hundred and eighty-three was also the year in which the Company obtained the Canadian patent to the Wheelock engine. This product was to prove an important one for the Company and more than 100 years later (1987), at least a few of these engines are still known to be in operation.

Electric light was introduced in the Company in 1884.

Three articles of apprenticeship survive from the year 1884. One, for a fifteen year old boy, binds him as an apprentice iron turner for four years. The Company is bound on its part to pay him, "in lieu of lodging food and clothing, the sum of forty five cents for each day of ten hours worked, for the first two years, rising to fifty and then fifty five cents for the last two years".

In September of 1884, *The Globe* newspaper of Toronto praised the Company's "exceedingly valuable and attractive exhibit" at the Toronto Exhibition, while congratulating it on its large and successful business. According to *The Globe*, Goldie McCulloch & Co. safes had taken all the first prizes wherever they had been shown.

A Toronto branch of the firm must have been in existence for some time, since *The Galt Reporter* noted in June of 1885 that "The Toronto office and warerooms of Messrs. Goldie & McCulloch Galt Safe Works has removed to large and commodious premises No. 56 King Street West".

A fire engine was produced at the Foundry in 1885 and put on the market after several trials. "The engine is designed to supply places which have no steam fire engine or as an adjunct to towns having only one steamer" according to *The Galt Reporter.*

> *It is a small compact piece of machinery, very powerful in all its details, the motive power being obtained from horses. From the centre portion of the engine project four long arms, which if desired, four double teams of horses can be attached. These horses go round at a walk, and by the power obtained, acting on the machinery, a very powerful stream of water, superior to almost any workable hand engine is thrown.*

The Galt Reporter also noted the graduation from the University of Toronto of "our young friend, Mr. R. O. McCulloch, son of Hugh McCulloch Esq." with a BA degree in June of 1885.

The Imperial Bank (on Water Street South in the main business area of Galt) received one of the new Goldie McCulloch time lock safes in 1886. *The Galt Reporter* thought the device was quite hilarious.

> *All the 'boodle' of the Commercial building occupants is going to be kept in this safe and when anyone outside wants to borrow a dollar or two, don't you see — ah, so sorry but the time isn't up yet and we can't possibly get at our funds. Big idea that!*

In June of 1886, Goldie McCulloch & Co. was again undertaking construction. The old saw factory, adjacent to the Foundry, was torn down and replaced by a stone building 140 feet x 64 feet and two stories high. William Webster was the contractor. In the following year, Webster was once more at work renovating the machine shops. Modern manufacturers might well envy the fact that although "an entire building [was] being renovated, so far that when completed there will scarcely be a stick of timber or a stone in its original place, yet the machines therein have never stopped running, nor men lost any time".

Since the renewal of their partnership made in 1866 and renewed in 1883 had now run out, John Goldie and Hugh McCulloch signed another agreement in 1888. The name was still to be Goldie McCulloch & Co. and the business was to "...be carried on as heretofore in the premises known as the Dumfries Foundry and at such other place or places as the partners shall determine". This time, the sum which the partners were empowered to draw out of the yearly profits of the firm was set at ten thousand dollars. Both partners were to engage in no other business than that of the Company. Two other pieces of property in the block bounded by Forbes, West Main, Malcolm, and Glebe Streets was acquired by Goldie McCulloch & Co. in 1888.

The Company announced its winter work hours for 1888 to be from 7 a.m. to 6 p.m. daily, with Saturday 7 a.m. to 4 p.m.

An Iron Moulders' Strike took place in southern Ontario in 1889. The Galt moulders' committee drew up a memorandum which they submitted to the employers of the town. In respectful terms they pointed out that in the neighbouring towns moulders were paid $2.25 to $2.50 a day, while in Galt they only received $1.75. They required that their pay be increased to $2.00 for a ten hour day, since their work was superior and the cost of living high. The employers were indignant and claimed that they were perfectly willing to deal with individual men about their pay, but flatly refused to have anything to do with the Iron Moulders Union.

A strike was called and 31 men in Galt walked out, eleven moulders from Goldie McCulloch & Co. among them.

Moulders were brought in from outside to take the place of those on strike, including five French Canadians from Montreal, who were to go to Goldie McCulloch & Co. However they seem to have taken one look at the situation, decided it was too menacing, and left town.

Things began to get rather unpleasant, and one of the local foundries was vandalized. Special constables were sworn in, but by April 11th the moulders were discouraged and the strike was called off.

Only one man was taken back by a local foundry at the proposed raise in pay. On May 30th *The Dumfries Reformer* announced that several Galt moulders had been discharged. One of the Goldie McCulloch & Co. men was arrested and tried in County Court for violence and obstructing the return of work of a non-striking moulder, but he was subsequently acquitted.

While his brother Robert was studying law at Osgoode Hall in Toronto, Hugh McCulloch Jr. was working his way through the Company learning the business. In April of 1890, it was reported that the foremen and office staff "waited upon him" and presented him with a silver water pitcher, together with an address in which they expressed their best wishes on the occasion of his marriage and hoped that the "slight but tangible memorial of the event'' would serve as a reminder of the long period during which ''our friendship has been unbroken and our relations very pleasant and satisfactory''.

Even though safes were an important product for the Goldie McCulloch & Co. during this period, gas and gasoline engines formed a large part of their trade, as catalogues and sales records of the period show. Mill machinery was also an important product line.

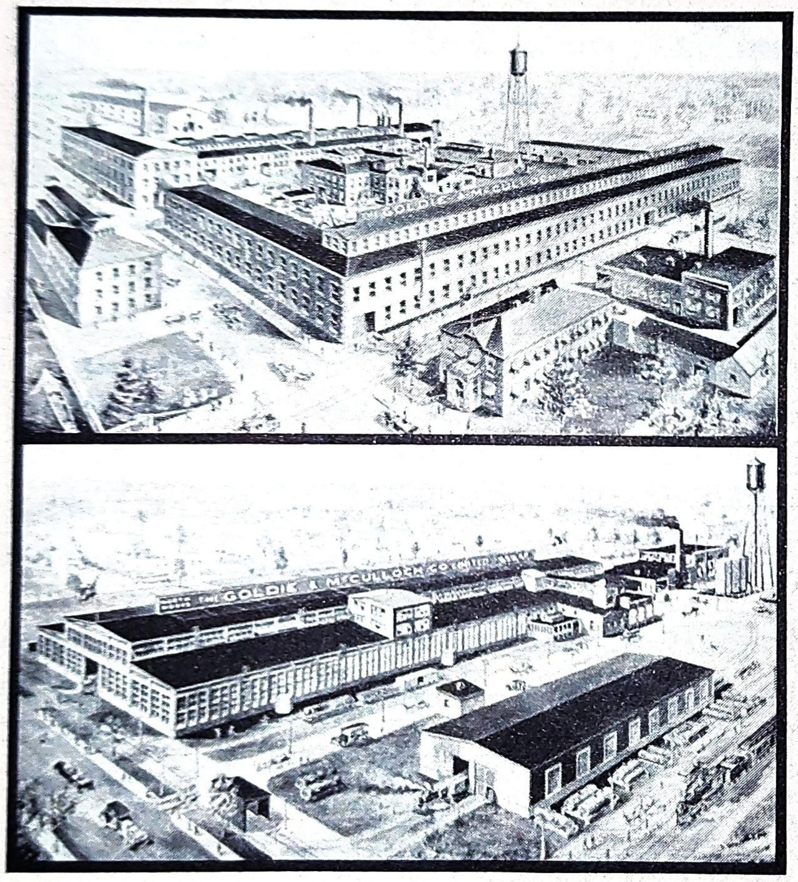
A patent for the Wheelock engine was taken out in 1888 though there is plenty of evidence to show that this engine was being sold for some years before. An article from the *Canadian Manufacturer* of 1890 lists nineteen prominent Ontario manufacturers who had lately been supplied with these engines by Goldie McCulloch & Co., and in a fifty year period from this time, over 2000 Wheelock engines were produced by the Company.

Eighteen hundred and ninety-one was also the year in which the first Galt Hospital was built. Mr. Goldie and Mr. McCulloch had been members of the executive of the hospital trust and together they donated the money to buy the five acres on which the hospital was to stand. The property was at the top of a gentle hill on Sprague's Road (now St. Andrews Street) overlooking the town. The stone building was designed by a Galt architect, Frank Mellish, the contractor again being one William Webster. Later on, the McCulloch family gave a nurses' residence on the same site in memory of Hugh McCulloch, Senior. The old hospital is still in use by the Salvation Army as a retirement home and is called the Eventide Home.

And, in 1891, the Company was incorporated.

CHAPTER
3

1891-1922


THE GOLDIE & McCULLOCH CO LIMITED

Aerial views (Top) South Works (Bottom) North Works c. 1920

THE GOLDIE & McCULLOCH COMPANY LIMITED

On April 21, 1891, John Goldie and Hugh McCulloch incorporated their partnership under the name of "The Goldie & McCulloch Company Limited". The amount of authorized capital stock was seven hundred thousand dollars. The sons of the original partners, David Goldie of the village of Ayr, miller; Hugh McCulloch Jr., accountant; and Robert Osborne McCulloch of the city of Toronto, barrister-at-law, were taken into the company. Hugh McCulloch, Sr. became president and John Goldie was appointed manager.

An article published in *The Dumfries Reformer* in 1899 reported that:

> *...about five years ago, the space devoted to the manufacture of boilers [at the Goldie & McCulloch Company Limited] was entirely too small, and as a result, what is now the North Works was built and is now devoted entirely to the manufacture of boilers, heaters and special plate work of all descriptions.*

Thus it appears that the first buildings on the North Works property were erected about 1894. The Company has no records of the exact dates of construction.

In 1895, A. R. (Alex) Goldie graduated as an engineer from the School of Practical Science at the University of Toronto, and joined the firm as assistant manager at the age of twenty-two. R. O. (Robert) McCulloch was still practicing law in Toronto according to the evidence of a letter written by him in his capacity of legal adviser to the firm in 1896.

John Goldie, who had bought the firm with Hugh McCulloch in 1859, died in 1896. He was succeeded as manager by his son, Alex. Robert McCulloch returned to Galt as secretary treasurer of Goldie & McCulloch Company Limited in November of 1897, and was followed to Galt by his family the next year.

An item in *The Galt Reporter* on April 7, 1898 described the company's expansion under the headline "NOW OWN THE WHOLE BLOCK":

> **THE GOLDIE-McCULLOCH CO. SHOW**
> **ENTERPRISE — MORE BUILDING**
>
> *The Goldie-McCulloch Co. Ltd. yesterday affected the purchase of the balance of the block bounded by West Main, Forbes, Glebe and Malcolm Sts. in which part of the immense works are situated,*

> *the property bought being owned by Miss Cant and Mr. Robinson. It is the intention of the company to still further enlarge their moulding shops. When the new buildings are completed, the old Dumfries Foundry will occupy the whole of that large piece of territory — a block 300 by 500 feet, covered with two and three storey stone buildings. The offices on the south-east corner of Malcomson [sic] and West Main, are also being more than doubled in size.*
>
> *All these buildings together with the large safe works of the Company across West Main Street, lining the bank of the river, create in the minds of visitors a vast amount of respect for the business capacity behind the big corporation.*

As the company grew, so did its sophistication to include its willingness to send its personnel to the United States for training in such non-production specialties as advertising. In June of 1899, a newspaper article noted that the company had sent F. B. Uxley, who was in charge of advertising, to a Chicago art school to polish his skills.

The introduction of still another specialty by Goldie & McCulloch Company Limited caused *The Galt Reporter* to comment on July 21, 1898 under the heading "WILL MAKE GAS ENGINES":

> *The Goldie-McCulloch Co. have just added another specialty to their list of first-class manufactures, this time one that will be welcomed by the smaller class of manufacturers generally, in the shape of a gas and gasoline engine. The company have purchased the exclusive right to make The Model gas engine in Canada, an American perfection that has a continental reputation, and which is so designed that it can be run with either gas, natural or manufactured, or gasoline.*
>
> *The great disadvantage with nearly every other style of gas engine lies in the intricacy of its mechanism and the consequent liability to constantly be getting out of order. The majority of these engines also require three or four men to start them as the big fly wheel has to be kept revolving until the gas gets all through the cylinder and gains power enough to run the wheel itself, a process that sometimes takes several minutes.*
>
> *In the Model, however, both these features are done away with entirely, the simplicity of its get up and the ease with which it can be set in motion being perhaps its characteristic points of recommendation. The consumption of gas is also much less. This engine ought to meet with an enormous sale, as the field is large and those who are using engines of this nature will consider it a big stride nearer the millenium to get one that they can depend upon to do its work regularly and continuously. It has arrived on the field at a most opportune moment, too, as the question of cheap*

> *power is one which is absorbing the attention of manufacturers all over the Dominion. The Goldie-McCulloch Co. are to be congratulated on this manifestation of enterprise.*

In 1899, Goldie & McCulloch Company Limited made a move to further expand its product line by entering into an agreement with the Linde British Refrigeration Company, Ltd. to manufacture Linde's line of refrigeration equipment. Linde's letterhead at the time claimed "over 4500 machines sold". It is not known precisely how big a product line this became for the Company, but many letters still exist in the Company's files in which Linde (through its Montreal office) ordered various pieces of equipment, such as compressors, from the Company.

It is interesting to note that the Company was even at this time exporting its products beyond the United States, witness this August 3, 1899 notice in *The Galt Reporter* under the heading "MACHINERY FOR MEXICO":

> *The Goldie-McCulloch Co. have just been given an order for $4,000 worth of sugar making machinery by a company doing business in the City of Mexico. The Goldie-McCulloch Co. have frequently made small shipments of machinery to Mexico, but this will be the largest consignment of all. They are to be congratulated on their expanding reputation.*

The Company was also selling engines and sugar making equipment into Cuba at this time although its activities were disrupted somewhat by the Spanish American War. The following is also from the August 3, 1899 *Galt Reporter:*

> *Mr. Wm. Kynoch, who returns to Cuba in the early part of September will take with him one of the Goldie-McCulloch Co.'s famous Wheelock engines of about one hundred horse power, as well as considerable machinery. Brooks & Co., the large sugar manufacturers of whose business Mr. Kynoch is superintendent, have, of course, suffered severely by the late war in the general demoralization of the sugar cane fields and all the commercial fabric of the island. As an indication of the extent to which their refineries have been affected, it needs only to be pointed out that this season they have made only 4,400,000 pounds of sugar, whereas they made as much as 13,200,000 pounds in a good season and under favorable conditions.*

A comprehensive catalogue, including engraved illustrations of more than 80 models of woodworking machinery, was issued by Goldie & McCulloch Company Limited about 1900. This wide span of products included such devices as planers, molding machines, tenoning machines, cutoff saws, ribbing, boring, and dowelling machines, and lathes.

A newspaper in the neighbouring town of Paris *(The Paris Review)* praised Goldie & McCulloch Company Limited in the most enthusiastic terms, and on December 22, 1902 *The Galt Daily Reporter* quoted it as saying:

> *And yet many Ontario industries look like thirty cents compared with that magnificent old industry, that has made the name of Galt famous from seaboard to seaboard. We refer to the Goldie & McCulloch Co. Not only every Galtonian but every Canadian regards with pride and satisfaction that splendid monument of Canadian industry, and the sterling integrity of the men at the head of it. The hum of many a mill in city, town and hamlet all over this country owes its motive energy to the great works referred to, and if Galt possessed no other industry, she would still possess an industrial individuality and prestige all her own, by reason of its location in her midst.*

Why then, *The Galt Daily Reporter* asked, was the company meeting so many obstacles in its efforts to enlarge its shops, and why was the municipality making no effort to help?

> *As a consequence of individual opposition outside the council and the action of gentlemen in authority, the new works of the Company will be built in the Township of Dumfries, one mile from the present shops... The new location comprises twenty-six acres and there the company will find ample scope for their great plant, with railway facilities of the most satisfactory character. But why should the industry be driven to Hunters Corners? [Now the corner of Water Street North and Coronation Boulevard.]*

(Although not especially germaine to the history of the Company, it is of at least passing interest to note that *The Galt Daily Reporter* sold for one cent at this time!)

Goldie & McCulloch Company Limited advertised in the Board of Trade's 1902 publication of *Picturesque and Industrial Galt.* The advertisement for safes and vaults also lists "Prison and jail cell doors" among its products. The same publication makes some interesting observations about the local engineering industry as it existed at that time.

> *The tendency in Galt has been to 'colonize' in machine enterprises. Big shops have produced men who have established small works and gradually the town has impressed itself upon buyers as a place where a good choice can be made when the articles sought are either engines and boilers, or wood-working machinery and iron tools. The incentive to produce a first-class piece of machinery has not been absent among the Galt manufacturers since the first engines and boilers were made here, and this constant progress is the order of the day.*
>
> *The country knows Galt as an iron machinery centre — though*

> *we boast of a number of flourishing industries of a different character — and our position is being strengthened yearly.*

Safes were for many years an important product of the Company. Goldie & McCulloch Company Limited received many compliments from customers on the quality of its safes, including this one recounted in the June 26, 1902 issue of *The Galt Daily Reporter:*

> **A SAFE MADE BY THE GALT FIRM IS REALLY A SAFE**
>
> *Two of the Goldie McCulloch Co's "Fire Proofs" Come Through the McIntosh Fire in Toronto in Good Shape.*
>
> *The Goldie-McCulloch Co. of Galt, is one of the best known of Canadian safe makers and their product is everywhere recognized as being not only the most finished in appearance, but as also most admirably suited to fill the requirements of a fire and burglar proof safe. The following letter bears evidence to the remarkable durability of the Goldie-McCulloch Co. safe even under the most intense heat. It is from P. McIntosh & Son, the well known produce merchants, Toronto, whose large plant was recently consumed by fire.*
>
> *"In our recent fire, which as you know was a total wreck and of which we are sending you a photo by this mail, we had two Goldie-McCulloch safes in which we kept all our books. They have come through the fire in remarkable shape and we feel that our praise for your safes cannot be great enough. This fire was an extremely hot one, the locality in which these safes were being surrounded by hay and grain as well as large quantities of packages, barrels and boxes. We might say that everything was burned to a crisp, heavy iron being twisted and melted into frightful shapes. We had almost given up all hope of being able to get the books and documents from the safes in such a manner as to make them of any use to us, which we can assure you would have been a very serious matter. We were agreeably surprised, however, on reaching them. While we found the safes somewhat warped and bent on the outside, yet all our books and documents came out in such a manner that we can get everything from them all right. This without a doubt was an extremely hot fire and the way in which they came through it leaves no room for question as to the manner in which they are made and the stuff they are made of. We congratulate you on the safes you turn out."*

Among the pattern makers' time books which survive from the period 1904-1951, that of 1904 is of interest. It is arranged by individual worker and under each section are listed the nature of every assignment, the number of hours estimated to complete the job, and the actual time taken.

There are fifteen pattern makers included in the book and inside the front cover is a list of the total number of jobs done in the shop. Assignments vary from the making of a name plate for "Sheldon & Sheldon, Heating Engineers" to the making of various parts for Wheelock, Ideal, and Corliss engines.

Record cards for workmen dated in the first decade of the twentieth century are very frank about their characters. Comments such as the following are common on these record cards:

> *"Wanted him to work full time. Boozer."*
> *"Feelings hurt, foreman told him to sharpen his drill."*
> *"Just fair."*

At this time, boiler feed pumps and condensers were an important product line and were being supplied to customers not only in Ontario but also as far away as Manitoba, Alberta, British Columbia, and New Brunswick according to an early record book of sales.

Given the vital importance of water tube boilers to the Company's later success, it is worth taking some note of the early development of this product line. By 1910 or 1911, the Company was advertising water tube boilers in *The Power House.* These ads mentioned "Return tubular, horizontal marine, vertical and portable boilers, with or without wheels". The boiler shown in the advertisement is similar to the four drum Stirling boilers marketed by the Babcock and Wilcox Company in the US shortly after the turn of the century except that the Goldie & McCulloch Company Limited boiler has six drums: three steam drums and three mud drums. At the same time and in the same publication, Babcock and Wilcox, Limited (UK) was advertising its "Patent water tube steam boilers with furnaces for all classes of fuel or waste gases." The British company advertised its boilers as "Absolutely safe up to the highest pressure." (Litigation must have been much less common in those days!) The British company had been active in Canada for some years. The first boiler sale of the British company into Canada was Job No. 71 which was ordered by the Nova Scotia Sugar Refining Company Ltd. of Halifax on August 27, 1884. The order was for two boilers totalling 208 horsepower in a battery. They were additions to an installation of six other boilers that had been supplied from the US during the period 1882-1884.

In 1890, Albert Holden & Co. of Montreal was the representative of Babcock and Wilcox in Canada. With the incorporation of Babcock and Wilcox Limited in London in 1891, Canada became the territory of the British company. Nonetheless, as late as 1896, the American company had an office in the Board of Trade Building in Montreal. By 1897, this office was closed and neither the British nor the American company had a Canadian office at that time. Mr. L. R. Flint opened the British company's Montreal office in about 1898, and he was joined by one H. W. Weller in 1903. Weller had received his early training in Great Britain as a mining engineer, but he later moved to the US where he worked for a while as an assistant to Thomas Edison. In 1905 Flint was transferred to Buenos Aires and Weller became the senior representative of the British company in Canada which position he held until the amalgamation of 1923. The British company had opened an office in Toronto by 1905, and offices are known to have existed in Winnipeg and Calgary *circa* 1913.

In correspondence with the British company in 1986, the British company advised that they had sold 1256 boilers into Canada, and in later correspondence they advised that this total was probably low. Some of their customers in Canada bought many units, e.g.:

CUSTOMER	NO. OF BOILERS
Canadian Pacific Railway Co.	*84*
Dominion Coal Co.	*55*
Dominion Iron & Steel Co.	*46*
City of Edmonton	*21*
Winnipeg Electric Street Railway Co.	*21*
Calgary Corporation Electric Lighting	*20*

Prior to 1923, boilers of the British company were also installed in parliament buildings, banks, universities, stores, office buildings, hotels, convents, hospitals, and prisons.

The exact pedigree of the Goldie & McCulloch Company Limited design of water tube boilers is unknown. Some of the designs or design features were probably developed by the Company. Other aspects might have been copied in part from existing designs such as those employed by the British and American Babcock and Wilcox companies or from other boiler designers and manufacturers of the era. Certainly some of the technology came from people that Goldie & McCulloch Company Limited were able to hire away from their competitors. The circumstances surrounding an interesting example of one such hire was recounted in a June, 1965 issue of *The Evening Reporter:*

> *It was back in 1912 that Andrew Kidd Sr. and family came out to Canada from Scotland and located in Hamilton. He was a boiler maker by trade, employed by Babcock and Wilcox at Renfrew, Scotland, but on arriving in this country worked in various foundries. In some unknown manner, Jas. Buchanan an engineer and traveller for Goldie and McCulloch Co. learned that Kidd was located in Hamilton. He contacted Kidd and arranged for him to have an interview with the late A. R. Goldie and his superintendent, David Hastings, for a Saturday. The local firm was then interested in manufacturing an upright boiler and up to that time had been importing forgings from the Babcock-Wilcox Co. in Scotland.*

> *When Hastings asked if Kidd had made forgings like those imported ones, he said he had.*
> *Hastings, so the story goes, disputed his word, replying those forgings they were looking at had been brought from Scotland. Nevertheless Kidd said he had made them, and pointed to a diamond stamping with a "K" in the centre of it, which Kidd said was his personal identification, indicating he had passed the forging in an inspection. That 'sealed' Kidd a job and he was hired there and then and that is how the Kidd family came to Galt. And Andrew Kidd Sr. also proved to be a prophet and 'knew what he was talking about'. In 1913 he told his superintendent David Hastings that within 10 years Babcock and Wilcox would either buy out or amalgamate with the local firm and exactly ten years later, in 1923, the amalgamation took place.*

The earliest record that can be found in the Company of a water tube boiler contract is one for three sectional water tube (SWT) boilers sold on June 3, 1913 to R. Hamilton and Company for installation in the parliament buildings in Victoria, B.C. All three units were shipped on December 10, 1913. This order was followed quickly by an order on June 28, 1913 for one SWT for the Kelsey Wheel Company in Windsor, Ontario (shipped September 30, 1913) and another order on July 1, 1913 for four boilers for the Michigan Central Railway. Bulletin No. 30, issued in March 1914, announced that the company had decided "to lay down special plans and enter the field with boilers of this type" (water tube boilers of sectional design). The bulletin is illustrated with a photograph of the North Works, as well as with drawings of type A, B, C, D, and G boilers, and while it includes a picture of the Kelsey installation and parts of the Michigan order on railcars being shipped, this publication does not include a reference list. By the time Bulletin No. 34 was issued in April of 1917, the Company was able to include in it a reference list of 63 sectional, Type B, and Type G water tube boilers (including 5 Type B boilers for its own factories). In that bulletin, the Company described its entry into the water tube boiler market as follows:

> *Water Tube Boilers of various types are now used in all parts of the world, but it has long been recognized by engineers and others interested in steam generation that improvements might be effected so that increased evaporation and more economic operation might be obtained.*
> *In order to meet this rapidly increasing demand for more efficient and economic Boiler Operation, we decided a few years ago to enter the Water Tube Boiler field and the G. & McC. Sectional Water Tube Boiler is the result.*

The Company's water tube boilers apparently met with some success since a similar bulletin dated April, 1922 gives a reference labelled "Some Canadian Installations" of 157 such boilers to include one Type D installation consisting of three boilers for one of Canada's most famous landmarks, the Chateau Frontenac in Quebec City.

With these water tube boilers, which could be entirely manufactured in Galt, Goldie & McCulloch Company Limited was able to compete with British Babcock and Wilcox Limited in the Canadian market from 1913-1922.

The earliest minutes of the Board of Directors of the company to survive are those of Monday, February 8, 1909. The gross profit for the previous year was stated as $110,652.18 with a net profit of $30,878.96 on sales of $582,546.95. The shareholders received a dividend of 5%. The president, vice president, secretary-treasurer, and manager each received a salary of $3,500.00 per annum.

Hugh McCulloch Sr. died in 1910 at the age of 84. At the time of his death, McCulloch still carried the title of president, but he was not active in the day to day affairs of the Company. He was buried by the Reverend Rural Dean Ridley of Trinity Anglican Church since his own minister of Knox's Presbyterian Church was out of town. Such was the rivalry between the two Presbyterian churches of Galt at the time that an Anglican clergyman was chosen rather than the minister of the "other" Presbyterian church to conduct the service. The pallbearers at the funeral were the foremen of the different departments of the Goldie & McCulloch Company Limited works. Flags were flown at half mast on all the public buildings of Galt.

Hugh McCulloch, Jr. became president upon his father's death.

There was more emphasis on the manufacture of boilers from this time on. The woodworking machinery business was disposed of to the Canadian Manufacturing Corporation in 1910 in return for common and preferred shares of the Canadian Manufacturing Corporation.

Even at this early date, the Company was in the service business. And notwithstanding access to rail transportation, the Company had to avail itself of every possible mode of transportation to ensure expeditious delivery of its products, especially repair parts. An October 12, 1912 production order for a 16 foot x 3½ inch diameter boiler tube for the Valley City Seating Company in Dundas, Ontario is marked "Hurry" and is annotated with the following instructions: "Have this brought down to the Galt House in time to catch the stage which leaves there about 5 o'clock this afternoon."

Safes were outselling other classes of products at this date but the following year safe sales were overtaken by sales of engines. Speaking in 1971 of the Safe Shop, Cecil Smith (retired) remembered it as a separate and very secret department. As for assembly methods and equipment:

> *The vault linings were of chrome steel, hardened and erected in*

> *the shop, then dismantled and shipped. How did they make them? Equipment they didn't have was electric drills, dial indicators or electric cutting equipment.*

Mr. Smith also reminisced about working conditions in the shop about 1911. According to him, Mr. Hastings, the superintendent, while strict about such things as smoking while at work, allowed the men a lot of independence in the carrying out of jobs.

> *His routine was to go to the North Works at 7 [a.m.] then to the South Works by horse and light wagon at 8 and repeat the same routine after dinner. Each man ran his department. If Jimmie Biggar wanted a tool made, I made it. I might say that if a man applied for work and he had a Scotch burr his chances were pretty good. You may wonder what Goldies made in those days. Mill machinery for flour, oatmeal, etc. Pulleys were a big item, made with a cast iron hub. Fly wheels for Wheelock and Corliss engines, also horizontal engines called Ideal. Boiler feed pumps were another item. Ice or refrigeration machines for the Linde Company... During the 1914-18 war the firm made up to 1600 shrapnel shells a day and forged many more at the North Works.*

The outbreak of the first World War made changes at Goldie & McCulloch Company Limited inevitable. Employees' work cards read "gone to war", "gone to the front", and "left to join the Navy".

Part of the South Works was converted to the manufacture of schrapnel and proof shells for the Imperial Munitions Board. A production order, dated August 30, 1916, is for 50,000 shells at the rate of 7500 per week "until the order is completed". This is only one example of many orders which were shipped to the Chief Inspector of Arms, Cove Fields, Quebec. "Shells" and "shell forgings" take their place in the financial statements of the company as an important product line during the war years. These statements also record large donations to the Canadian Patriotic Fund, the Navy League, and the Red Cross. Substantial investments in Dominion War Loan bonds were made on behalf of the shareholders. Orders were also received from the government of the United States for munitions in 1918 after the US had joined the Allies in the war in Europe.

Hugh McCulloch, Jr. died in January 1917, after serving for seven years as president, and at a special meeting of the Directors held on the eleventh of that month, R. O. McCulloch was appointed president for the unexpired term of his father's presidency. This appointment was made permanent in the following year. At the January 11th meeting R. O. McCulloch gave notice that he would bring forward a motion at the next directors' meeting to have the position of secretary treasurer divided into two positions. A. R. Fleming continued as secretary, a function he performed for many years both for Babcock-Wilcox & Goldie-McCulloch

Limited and for the safe company of Goldie & McCulloch. (The safe company was split off in 1923.)

Fifty years later, steam turbines for electric power generation were to become a highly specialized field with only a few companies in the world building them and Babcock & Wilcox Canada was not one of them. However, during the 1910's and 1920's, Goldie & McCulloch Company Limited did offer steam turbines for sale. The steam turbines being offered by the Company at this time were of the Wait design. The Company's advertising brochures showed these turbines connected to generators for the production of electricity, although it is not known whether or not the Company manufactured generators. The Company's Bulletin No. 38, dated June, 1919, offered eight types (models) of Wait steam turbines and described their pedigree as follows:

> *This Turbine is the result of a very extensive and systematic investigation, extending over seven years, of steam turbine designs and construction in this country and in Europe.*
> *The investigation has been conducted under the leadership of Henry H. Wait, Consulting Engineer, Chicago, a prominent authority on the subject.*
> *The first turbines were built and put in operation five years ago, after the basic principles had been decided upon, and they have proven eminently successful.*
> *Careful attention and continued improvements of the details have since produced the machine that combines the highest efficiency with greatest simplicity and ruggedness.*

Sales of vertical marine pumps are recorded from 1918-1938. They were installed in some of the largest and most important factories in Canada. Goldie & McCulloch Company Limited displayed machinery in the Toronto Exhibition of 1920. Water tube boilers, superheaters, centrifugal and marine pumps, as well as safes were among the products shown.

The company took out a two page advertisement in *Galt: The Gem City of the Famous Grand River Valley,* a pamphlet published by the Board of Trade in 1920. These advertisements indicate the division of functions between the North and South Works. The South Works was dedicated to the manufacture of horizontal and vertical steam engines, steam turbines, reciprocating and centrifugal boiler feed pumps, air pumps, condensers, marine power equipment and marine auxiliaries, safes, vaults, vault doors, and deposit boxes. The North Works was devoted entirely to the manufacture of return tubular boilers, water tube boilers, heaters, tanks, stacks, and other plate work. And yet, with all this heavy manufacturing, there exists an order dated 1919 for a sleigh to be used for local winter transport. The records don't specify which Works built it.

In February 1921, the number of company directors was increased from four to six, all directors being members of either the Goldie or McCulloch families.

In recent years, Babcock & Wilcox Canada has become more entrepreneurial and flexible in structuring deals to be competitive in the international markets. However, it is to be noted that such flexibility is not an entirely new phenomenon. Consider the following extract from a December 7, 1922 letter from A. R. Goldie to J. D. Griffin. Griffin was with the Hill Engineering Company which Goldie & McCulloch Company Limited was appointing its exclusive agent in South Africa.

> *In the lines in which you represent us, and which at present would be Boilers, Engines, Vertical Pumps and Condensers for Reciprocating Engines, you are to push the sale of our product as much as possible, and not to represent any other Company in these lines, but, in the meantime, as we are not sure as to our ability to meet the competition in some of these lines, and as our chief anxiety is to sell Boilers, we would have to leave it to your judgement not to lose a boiler order if you could get it by substituting, say, another make of Engine for ours in figuring on contract.*

Nineteen hundred and twenty-two was the last year of complete independence for the Company; in the following year the founding families sold the majority interest in the firm.

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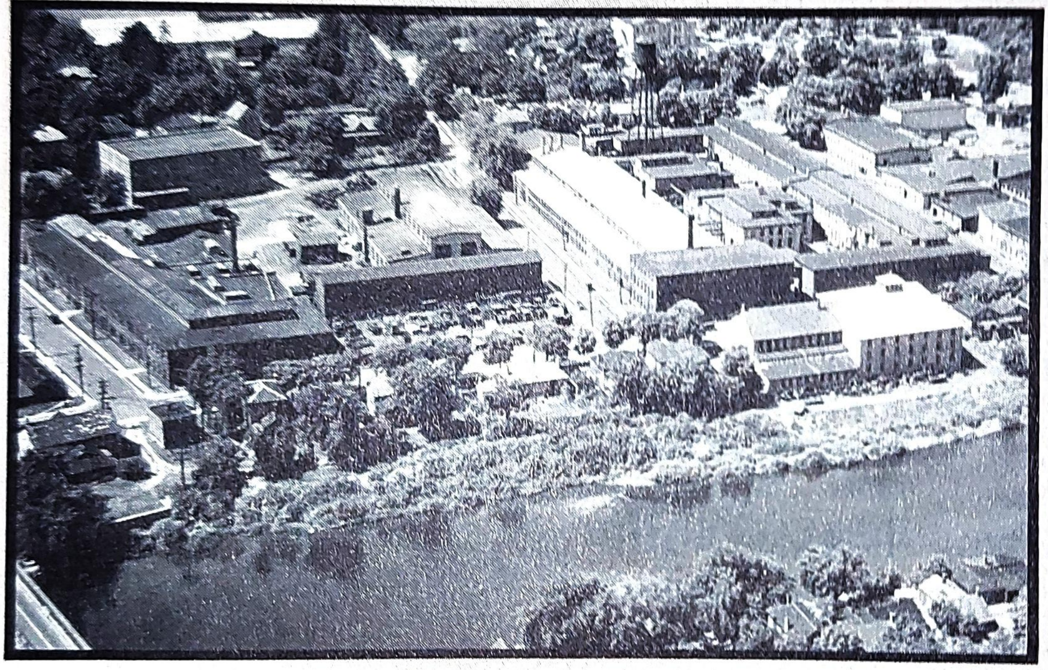
CHAPTER
4

1923-1939



BABCOCK-WILCOX & GOLDIE-McCULLOCH LIMITED PREWAR YEARS

1923-1939 BABCOCK-WILCOX & GOLDIE-McCULLOCH LIMITED
PREWAR YEARS

The events of the year 1923 were to alter dramatically the course of the Company. It was in that year that Babcock and Wilcox, Limited (the British company) and Babcock and Wilcox Company (the American company) bought into The Goldie & McCulloch Company Limited leaving the Goldie and McCulloch families minority owners in the firm. Technically, the purchase was an amalgamation and a new company was formed, but the result was much the same as if the British and American companies had simply bought controlling interest in the existing Goldie & McCulloch Company Limited.

The events leading up to the amalgamation were largely shaped and guided by the following individuals:

Robert O. McCulloch	President Goldie & McCulloch Company Limited
Alexander R. Goldie	Vice President Goldie & McCulloch Company Limited
Edward H. Wells	Chairman of the Board Babcock and Wilcox Company (US)
William Dixie Hoxie	President Babcock and Wilcox Company (US)
Auguste G. Pratt	Vice President Babcock and Wilcox Company (US)
Sir James Kemnal	Managing Director Babcock and Wilcox, Limited (UK)
Albert W. Atwater	Lawyer for British and American companies
Glyn Osler	Lawyer with Blake, Lash, Anglin & Cassels; Counsel for Goldie & McCulloch Company Limited

It is not known exactly how the initial contacts between the Babcock companies and Goldie & McCulloch Company Limited regarding a possible amalgamation took place. As noted in the previous chapter, the British company had maintained offices in Canada for some time and was actively pursuing the Canadian market. Per an agreement between the British and American companies, the Canadian market was left to the British company and was not pursued by the American company. Also, the American company was a partial owner of the British company at this time. Thus it is reasonable to expect that the British and American companies would have been interested in finding some mutually agreeable way to consolidate the Babcock and Wilcox position in Canada and to eliminate the competitive threat posed by Goldie & McCulloch Company Limited. Recall that the Canadian company, which had been producing firetube boilers for more than 50 years, was by 1923 well established in the water tube boiler business. In an interview given in 1986, Mr. H. L. McCulloch (later president of the Canadian company) stated that the amalgamation was triggered by a telephone call from Sir James Kemnal to W. D. Hoxie. Kemnal, according to this account, pointed out to Hoxie that Goldie & McCulloch Company Limited was doing considerable damage to Babcock and Wilcox boiler sales in Canada. Sir James supposedly suggested to Hoxie that Hoxie should visit Galt with the objective of determining whether or not the two Babcock and Wilcox companies should buy out or amalgamate with the Canadian firm.

Although the precise nature of the initial contacts is not known, it is known that both R. O. McCulloch and A. R. Goldie had held meetings with the American company in early 1923 (and possibly before that) to discuss the amalgamation. On June 8, 1923, W. D. Hoxie wrote to R. O. McCulloch as follows:

> *A cable just received from London indicates that our English friends are favorably disposed toward the scheme outlined during the last visit of yourself and Mr. Goldie to New York. At this writing we are awaiting the arrival of a letter in which they propose to discuss the matter in greater detail.*
>
> *Through our Mr. Pratt, who met Mr. Goldie at Hot Springs last week, I understand that you shortly expect to leave for several weeks' absence. We will, however, send to Galt two or three men in whom we have every confidence, to make up an appraisal of the property and tools, in your absence. They will report to Mr. Goldie and we will advise you several days before their departure.*

This letter initiated a sequence of activities including inventories, negotiations, and document preparation that became progressively more intense and feverish and which culminated in the signing of the necessary documents in late October and formal amalgamation of the companies effective November 1, 1923. Many of the notes and letters, some internal and some external, some handwritten and some typed, pertaining to this transaction are still in the Company's files and they provide interesting insights into and perspectives on the amalgamation.

In an undated handwritten letter to R. O. McCulloch (probably written shortly after Hoxie's letter), A. R. Goldie pointed out two areas that he thought might cause problems in the appraisal of tools and property suggested by Hoxie:

- *Comingling of materials for the safe shop and the machine shop.*
- *Disclosure of certain technology related to header dies that Goldie thought might be superior to what the American company had.*

With regard to the latter, Goldie wrote:

> *...so I can see no harm in allowing them to inspect the flanging room in general* but *I would have Hastings see that* all *the dies both for headers & crossboxes are covered up and out of sight. We could then say to them that they can see by the results that we have the tools required for the work. Kidd tells us that our header dies are much superior to what B&W used when he was with them.*

On June 20, Hoxie advised Goldie (R. O. McCulloch was away at the time) that the audit team would consist of Messrs. Tucker, Hartnett, and Lyle from the American company and that Tucker would be the team leader. In addition, a Mr. Warren from the Lynn Works of the General Electric Company, "...in whose judgement we have the greatest confidence", was to join the team later. (Note that at this time General Electric had not yet acquired its 12% ownership in Babcock and Wilcox; that did not occur until 1926.)

By July 9, R. O. McCulloch was still not back, and A. R. Goldie was about to depart on vacation. As a conscientious employee, he dutifully left his boss a typed letter supplemented by a lengthy handwritten note describing the adventures and misadventures that had occurred during his boss's (Mr. McCulloch's) absence. Included in the letter and note were details on such problems as railway rights of way, sales tax difficulties, a deficient bank balance, leaky shop roofs, a key employee threatening to quit, the Babcock and Wilcox inventory, and pump problems. (All of which must have made McCulloch feel good to get back from vacation!) On the Babcock and Wilcox audit, Goldie advised that the auditors "...went at it most thoroughly and I have had J. H. MacGregor check it over and he can find very little to criticize." Mr. Goldie also noted that he had been visited on July 1 by Mr. Isaac Harter, General Superintendent of the Babcock and Wilcox Company (US). Harter was to become something of a legend himself in the US company and was credited with much of the success of the Bayonne Works. Goldie went on to report that Harter "...seemed impressed with the place and particularly the way it was kept and run".

By July 12, Mr. Hoxie was able to write to A. R. Goldie that he expected to have the appraisal figures ready within a few days. Hoxie suggested that once Goldie and/or McCulloch had had an opportunity to review the figures, one or both of them should come to New York "...and we can have a conference on my boat. If you can arrive on a Tuesday morning I can take care of you on the boat during your stay, and make you fairly comfortable. In this way, you will avoid a sojourn in the hot city." Hoxie also advised that the meeting should take place before the end of July since E. H. Wells was leaving on vacation in early August and would not be back until September 4. As it turned out, the meeting eventually took place at the Commodore Hotel in New York City, on July 25, and both Goldie and McCulloch attended. The meeting was successful enough that E. H. Wells subsequently travelled to Montreal and spent July 31 reviewing with Atwater such details of the amalgamation as the proposed charter, land titles, and railroad sidings. In a letter to A. R. Goldie on that date, Wells stressed the importance of getting service contracts with key Goldie & McCulloch Company Limited employees. In a pencilled note on Wells' letter, Goldie wrote to McCulloch:

> *RO:*
> *They evidently put a great deal of stress on tying up Kidd and others. Could we have cashed in any more on this.*
> *ARG*

By the end of July, draft agreements were being circulated between the parties for comment.

By August 4, A. R. Goldie was back from vacation, but R. O. McCulloch was off on holidays at the Hackmatack Inn, in Chester, Nova Scotia. Several handwritten notes went back and forth between Goldie and McCulloch during McCulloch's nearly one month stay addressing such issues as employment contracts for key employees and the draft agreements. McCulloch's notes are written on Hackmatack stationery and include such notes as (August 6), "I hope you are not finding it too hot. It is cool here", and (August 10), "It is lovely down here. Quite the most charming summer place I was ever at. It has advantages such as delightful sailing and sea bathing and a most attractive golf course all on the sea." Goldie, of course, was back in hot, muggy Galt worrying about the deficient bank balance, the pump problems, and the leaky roof.

However, it appears from the following letter that R. O. McCulloch's holiday was not toally uninterrupted, and that he did have to make a trip to New York in mid-August. It also appears that the British company was finding the arrangements to their satisfaction, and that Mr. Wells was at least able to continue his fishing trip uninterrupted. On August 21, Hoxie wrote to Goldie:

> *We have received a letter from Sir James, acknowledging our cablegram that we sent him in relation to the agreement, and I feel sure he is pleased with the situation as discussed between*

> *us at the time of your last visit to New York.*
> *Any time you feel disposed to come to Bayonne, we shall be very glad to have you look over the plant, and if I am in the city, it will give me much pleasure to accompany you; and perhaps we may spend another night on board the "Idalia", when, I assure you, the waters will be as calm as they were at the time of your last visit, if we have to go up the Hudson River to get them.*
> *Mr. Wells is away on his fishing trip, and will not return until the 9th of September; and I trust you and Mr. McCulloch may have continued your holiday which was broken into by your visit to this city.*

There also exists a series of communications in late September including telegrams between McCulloch (in Galt) and Goldie (in the Commodore Hotel) over the overhead rate to be used to evaluate work in progress. Should it be the "standard" shop rates, or the actual rates in recent months which were higher because of low shop load? (Standard rates ranged from 110% to 200% depending on the shop; actuals from the month of July ranged from 99% to 313%.) E. H. Wells documented the solution in a letter to R.O. McCulloch on September 25: standards costs with some room to adjust for business volume. General business overhead and selling expenses were to be an additional 20%. In one of the letters on overhead rates, dated Monday Night, September 24, and handwritten on Commodore Hotel stationery, A. R. Goldie describes for R. O. McCulloch the results of a tour that he took of the American company's boiler factory in Bayonne, New Jersey:

> *I was all thru Bayonne this p.m. – to tell about it would be a long story – but if Renfrew plant is as good we are dead lucky to be with them and not against them. They certainly do things quick and well. I will try to tell you something about it later.*

On September 4, A. G. Pratt wrote to Goldie and (at Wells' instigation) suggested to Goldie that they go to England "...to discuss various matters with the people there, get to know the organization, and to see how they build boiler parts and their other products." The suggested trip took place in early October, and the Company has in its file a handwritten note that A. R. Goldie wrote to R. O. McCulloch from the Central Station Hotel in Glasgow on October 4, 1923 recounting the results of his trip. In it he notes that "...the net of it all is that Sir James has agreed to the entire agreement without any change and it will be signed on Monday...". Other items addressed were the disposition of the British company's staff in Canada and whether or not the British company would insist on supplying headers to the new company. Goldie goes on to say:

> *We spent all of today (Thursday) in the Renfrew Works. I can't*

> *begin to describe them, they are so big and elaborate. Generally they are taking more pains with their work and turning out a slightly better job than we are, but Pratt says they are also slightly better in this respect than the N.Y. Co.*
>
> * * *
>
> *Sir James is the quickest thinker and actor I ever saw — he is just like lightning — and seems to be a very hard worker. I think we shall get on with him alright.*

The remainder of the month of October was spent finalizing the amalgamation agreement and numerous other details attendant to the amalgamation. The transaction itself consisted of the formation of a new company, Babcock-Wilcox & Goldie-McCulloch Limited. The previously existing Goldie & McCulloch Company Limited sold to the new company all of its design and manufacturing businesses (to include real estate), with the sole exception of the safe business. The safe business continued to operate under the name of the Goldie-McCulloch Company Limited and remained in the hands of the Goldie and McCulloch families. The safe company rented part of the South Works and also paid for power, light, heating, materials, and for its share of office expenses, teaming, and blue printing. Office space and personnel were shared and the accounting staff kept separate books for the two companies.

The Goldie & McCulloch Company Limited was paid $1,300,000 for its contribution to the new company, and also received 7500 shares in the new company. The American and British companies received 14,500 shares to be split "...in such proportions as they may agree upon between themselves", which turned out to be 9250 for the British company and 5250 for the American company.

The Board of Directors was to consist of seven people. The first directors were Sir James Kemnal, William D. Hoxie, E. H. Wells, A. G. Pratt, R. O. McCulloch, Alex R. Goldie, and A. R. Atwater. R. O. McCulloch was appointed president, A. G. Pratt vice president and chairman of the Board, and Alex Fleming secretary.

The new company was to continue to manufacture boilers, boiler accessories, superheaters, economizers, stokers, engines, pumps, turbines, condensers, etc. Patents owned by the three constituent companies as well as access to the knowledge and experience of each was to be shared by all. Branch offices were opened in Vancouver, Winnipeg, Toronto, Montreal, and the Maritime provinces.

On October 22, the Board of Directors of The Goldie & McCulloch Company Limited approved the sale, and on October 29 the shareholders approved the sale at a Special General Meeting. By then the signing that remained to be done was little more than a formality, and on October 31, 1923 the necessary documents were executed in the offices of Blake, Lash, Anglin, and Cassels in Toronto.

1923-1939 BABCOCK-WILCOX & GOLDIE-McCULLOCH LIMITED PREWAR YEARS

The amalgamation was announced to the heads of departments, sales staff, and foremen of The Goldie & McCulloch Company Limited at a dinner on November 1, 1923 at the Clovelly Tea Rooms on Main Street in Galt. The general announcement to the press and the public was made the next day, November 2.

A. G. Pratt, who was a vice president of the Babcock and Wilcox Company (US) at the time of this transaction, subsequently served as president of the US company from 1924-1948. In his 1958 book, *The Babcock and Wilcox Company: Some of its History and Some Personal Recollections,* Pratt described the amalgamation with Goldie & McCulloch Company Limited as follows:

> *After World War I, the Canadians put on a strong drive to buy products "made in Canada." Neither B&W nor B&W Limited manufactured there. In 1923 B & W Limited joined with Goldie & McCulloch to form Babcock-Wilcox & Goldie-McCulloch Limited. Goldie & McCulloch was a very old, well-established but small Canadian Company engaged in the manufacture of return tubular boilers, pumps, small engines, condensers, and other power plant equipment. Each of the three companies had two directors on its Board, with R. O. McCulloch, President; A. R. Goldie, Vice President; and myself as Chairman of the Board.*

Notwithstanding all the high level distractions associated with the amalgamation in 1923, on the operating front good progress was being made.

The success of the year 1923, as far as product innovations were concerned, was the company's double suction portable fire pump. A bulletin, illustrated by photographs, was issued and many more photographs of the trials of this device exist in the company's records. Just about the time that a prototype had been developed and brochures prepared, a fire broke out on (October 14, 1923) at Gardiners' sash and door factory at the east end of Main Street in Galt. To quote the *Galt Evening Reporter,* "The Galt Fire Department were up against it. Their water pressure was not enough to fight the biggest fire Galt has ever seen. A Babcock-Wilcox & Goldie-McCulloch portable V-type pump was loaned, and was on the job steady for 35 hours without let-up." Gardiners claimed that "their entire factory would have been destroyed but for the excellent work of this pump."

In 1923, the engineering staff of the company founded its Engineering Society. The object of the Society was the exchange of ideas and information between themselves and their professional colleagues in other industries by means of talks, tours, technical papers, and the like.

In general, the period 1924-1929 was one of substantially increased sales but spotty financial performances as the North American economy pulled out of the post-war recession. Sales and profits at the beginning and end of the period were:

	1924	1929
Sales	783,051	1,353,908
Net Profit (Loss)	(160,266)	21,402

Product mix during the period 1924-1928 varied as follows:

	% OF REVENUES	
PRODUCT LINE	1924	1928
Boilers	48	52
Pumps	15	20
Machine Shop Repairs	5	6
Steam engine	1	1
Sundry	31	12
Stokers	0	7
Superheaters	0	2
	100	100

In about 1926, the so-called "Bull Tower", which has since become something of a landmark at the Company's North Works location, was built. The tower consists of a wooden vertical extension over a pre-existing brick base. The extension was built to provide additional headroom for the lifting and riveting of boiler shells. A vertical mandrel, about 20 feet high, was installed in the base of the tower. Drums (shells) that were to be rivetted were lifted over the mandrel and set down with the mandrel inside. A 125 ton press (Bull Press from which the tower got its name) then pressed the shell against the mandrel to round it and align it for riveting (a process referred to as "bucking up"). The shell was then riveted with rivets that were heated in ovens installed in the tower at an elevation above the mandrel. The last significant amount of riveting is believed to have taken place in the late 1930's, although the tower was still used occasionally for rerounding into the 1960's.

The North Works office had become overcrowded by 1927, and an addition was built in that year.

An employee club, called the Babcock-Wilcox & Goldie-McCulloch Social and Athletic Club, was begun in 1928. The purpose of the club was to "foster and control athletics and social functions among the employees". It was to be quite separate and distinct from the Benefit Society, and was similar in purpose and organization to the US company's Babcock and Wilcox Club which was organized in 1910. R. O. McCulloch and A. R. Goldie were elected honorary presidents at the first meeting and D. Hastings president. H. L. McCulloch and J. G. Goldie were elected vice presidents. Later presidents included Carl Johns and R. Law. Each department had a representative and there were chairmen for soccer, track, softball, social events, bowling, and hockey. An annual fee of between 50¢ and $1.00 was charged. There seems to have been some difficulty in collecting these fees since the executive was constantly raising and lowering them from year to year and one year passed a resolution that "...all fees should be collected in cash".

The high point of the Club's inaugural year was a trip made by the track teams to take part in an interplant meet in Barberton, Ohio. The club made a very creditable showing under the chairman of track, Mr. J. G. Goldie. By the fall of the first year the club had attracted 265 members. Many types of events were held by the club: euchres, dances at which Jack Baird's (Mr. Baird was head of the Personnel Department) band played, bingos, and a wide variety of sports events. The club was eventually dissolved in 1949.

A look at the list of contracts for 1929 shows that Babcock-Wilcox & Goldie-McCulloch Limited had delivered 180 pumps, 68 boilers, 7 superheaters, 10 engines, and 6 steam turbines during the year. Two of those boilers were 2 drum Stirling units of 100,000 pounds of steam per hour capacity for the Saskatoon Station of Saskatchewan Power Corporation. A further unit was supplied in 1939. This is significant in that it marked a trend from hydro (water) power in Canada to thermal (steam) power plants. In 1931 and 1937 the City of Edmonton purchased two similar units, the first of fourteen boilers to be sold to that utility. The Company also sold its first recovery boiler in 1929. It was a 60T unit for Canada Paper Company in Windsor Mills, Quebec.

The Depression years from 1930 to 1939 did not treat the Company well. Revenues declined from $1,920,000 to $975,000 and profits from a $71,000 profit to a $97,000 loss. In 1930, a major writedown of the Company's assets was approved in order to decrease the depreciation charges to a more realistic rate. The writedown was expected to reduce annual depreciation charges from $104,000 (1930) to something in the range of $55-60,000. However, even with these writedowns, financial performance during this period was disappointing.

The Canadian Foundryman published an article in February, 1930 about the foundry at the South Works. Describing the work carried on there at the time they wrote:

> *...air compressors of different capacities and pressures, vertical*

> *steam engines, single twin, compound and triple expansion, centrifugal pumps designed to work against varying heads and of various capacities, together with turbines, condensers, reciprocating pumps, stokers, etc. are manufactured [there].*

A reorganized Engineering Society gave its first annual dinner in 1930. The affair was held at the Iroquois Hotel on Main Street, and the speakers were R. O. McCulloch and A. R. Goldie.

Mr. McCulloch became chairman of the Board at the end of 1931, while Mr. Goldie assumed the presidency in January 1932, a post he held only until 1934.

The Benefit Society, made up of employees of the company, celebrated its fiftieth anniversary in 1933. This remarkable institution, which was supported by the contributions of its members and encouraged by the Company, supplied a welfare service in the days when governments in Canada were not involved to any significant extent in this area. Sick and death benefits were available to all members in need. A doctor was retained by the Society to care for the sick and injured, and coal and coke were purchased directly from the mines and sold to members at a bargain price. The Benefit Society also sponsored social events. Excursions and picnics to Niagara Falls and entertainments at the Town Hall and later at Scott's Opera House were also part of its program. These services were no doubt particularly welcomed during the Depression. Two hundred members of the Society gathered on October 18th, 1933 to celebrate the organization's anniversary and the six charter members who were present received the gift of an occasional chair each.

In 1933, the Company also made an effort to upgrade the competitiveness of its HRT and Cross Drum Boilers. In Bulletin No. 1049, dated March 1, 1933, A. F. Crawford advised the sales force that "...our HRT boiler data has been out of date for some time...", and that with the new data the Company had "...eliminated HRT heating boilers entirely and have started with power boilers 54" diameter...". The bulletin did say that Galt would be willing to estimate 48" boilers "...where we have a reasonable chance of securing the business..." but standard designs were to be estimated by the field salesman without reference to Galt using standard data. In Bulletin No. 1050, also dated March 1, 1933, Crawford gave similar instructions to the sales force on Series 32 Cross Drum Boilers. Crawford said that the Company felt it was necessary to produce a straight tube sectional boiler that was competitive with the various bent tube designs on the market. The bulletin goes on to say:

> *We believe that in the Design 38 Cross Drum Boiler, particulars and prices of which are now submitted, we have a real fighting proposition. We have made the prices low, but must strongly emphasize that they are based on an absolutely standard design,*

> *and it is up to our sales force to lead customers to our viewpoint and not have them impose their's on us. Any deviation from our standard would involve extra engineering and fabricating cost, which must be kept down.*

It is difficult to assess the effectiveness of the HRT and cross drum marketing efforts because of the economic distortions of the Depression, but sales of these units during the 1930's were as follows:

YEAR	HRT	SERIES 32 CROSS DRUM
1930	6	0
1931	3	0
1932	16	0
1933	9	0
1934	3	0
1935	7	1
1936	5	6
1937	10	6
1938	0	2
1939	4	0

Although not unique to the situation of the Babcock-Wilcox & Goldie-McCulloch Limited, it is illustrative of the hard financial times of the Depression era to consider notices that the Company received from its banks, the Bank of Montreal and the Royal Bank of Canada, concerning interest rates that would be paid on the Company's accounts with these banks. In May of 1935, both banks told the Company that the banks would not pay interest on current account balances of less than $50,000. The Bank of Montreal further advised that accounts over $50,000 would receive interest at the annual rate of 1% on any balance over $50,000.

Hugh L. McCulloch, grandson of one of the original partners of The Goldie & McCulloch Company Limited became president and treasurer in 1934 when A. R. Goldie was appointed vice chairman. He was the last member of the families of the founders to hold this office.

An interesting work record book exists which was begun in 1936 by pattern shop superintendent John McEwan. It is set out in the usual way, with the order number of each item and the date it was completed. The unusual feature consists of a series of pencilled remarks in the top margins about the workers. Not only are changes in the personnel of the shop recorded, such as:

> *"D. McCrea quit at 5 p.m. Oct. 9/36 to go to Montreal."*
> *"C. Johns resigned Jan. 6, 1941."*

but also deaths, marriages, and trips:

"Dick Biggs died Tues. a.m. Nov. 1/38 in his sleep"
"L. Sahagian wedding Oct. 9th."
"C. Scott's helper left for Old Land Feb. 21 to see sick mother"

and current events in Galt:

"Dr. Charlton died Thur. a.m. April 7th (1938)"
"Gov-Gen. Lord Tweedsmuir in Galt, May 19/37"

and in the outside world:

"King Edward abdicated Dec. 10th (1936)"
"Coronation Day, May 12th (1937)"
"Germany started to attack Poland, Sept. 1 (1939)"

The hard times of the Depression also hit Goldie & McCulloch Company's safe business which had not been included in the new company when amalgamation took place in 1923. On May 7, 1937, A. G. Pratt wrote to Lt. Col. J. H. M. Greenly (the British Company's representative on the Babcock-Wilcox & Goldie-McCulloch Limited Board of Directors) to recommend that the safe company be given some relief in the rental and other charges it was paying to Babcock-Wilcox & Goldie-McCulloch Limited. Pratt said that "Messrs. Goldie and McCulloch have been trying to sell this safe business for a number of years without success. It has dwindled to practically nothing. They are still trying to sell it." On June 3, Greenly wrote back concurring with Pratt's recommendation and saying that he did not see in "fairness and equity" how the higher payments could be justified any longer given the situation.

Two significant orders were received in 1937 from the pulp and paper industry. Brompton Pulp & Paper Co. Ltd. (later Domtar) purchased a 3 drum Stirling boiler for their East Angus, Quebec mill to burn black liquor, a by-product of the pulping process. On the west coast, Crown Zellerbach purchased a similar unit from Babcock-Wilcox & Goldie-McCulloch Limited for their Ocean Falls, British Columbia mill. Babcock & Wilcox design engineers, working closely with Domtar's Dr. Tomlinson, the originator of the black liquor for fuel concept, were pioneers in the development of chemical and heat recovery boilers and later established an enviable record of achievement in this field. For several years these units were known throughout the world as Babcock & Wilcox Tomlinson Recovery Boilers. These boilers were the first recovery boilers installed in Canada and among the first in the world.

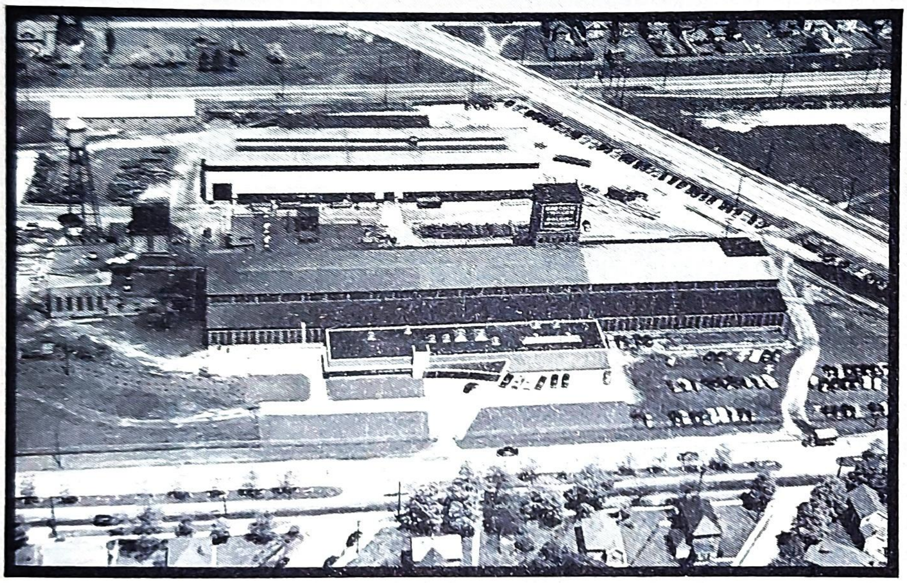
William A. Osbourne, an Irishman by birth, but with a BSc from the University of Toronto, was appointed Works Manager and elected a member of the Board in 1939. He had joined the company as sales engineer and became district sales manager in Toronto. He moved to Galt in 1934 when he was appointed Vice President - Sales. Osbourne was later to become president of the Company.

On May 17, 1939 Hugh L. McCulloch wrote to A. G. Pratt, president of Babcock and Wilcox, New York, to say that he thought he shouldn't attend the ABMA & AI annual convention there because of the expenses involved and in the light of "the poor business conditions."

These conditions were about to change, with the outbreak of the second world war in September of 1939.

CHAPTER
5

1939-1947



Aerial photograph of North Works c. 1950.

BABCOCK-WILCOX & GOLDIE-McCULLOCH LIMITED WAR YEARS

1939-1947 BABCOCK-WILCOX & GOLDIE-McCULLOCH LIMITED WAR YEARS

In June 1939, the Company received an order from Stone & Webster Engineering Corporation for an oil fired Type F boiler for Jamaica Public Service Company Limited which is believed to be the first utility boiler built by the Company for export.

By the winter of 1939, the Company was once again preparing for war production. As the nation mobilized its industrial base to support the war effort, more and more of the output of Canadian companies was directed to national defense, and certain restrictions were placed on the private sector to ensure effective mobilization and to hold inflation in check. Among the restrictions so imposed were wage and salary controls. In a wage control document submitted to the Department of National Revenue in 1943, the Company supplied certain supplemental information that serves to give an indication of just how great an effect the war had on the Company. This information read in part:

(9) The relative proportion of war business to non-war business in the years 1942 and 1943 is as follows:

ITEM	**1942**	**1943**
40-mm. Shells	$ 870,432.	$ 500,970.
Boilers for Minesweepers	1,182,718.	1,807,066.
Engine Generator Sets for Navy	261,713.	1,020;655.
Boilers, etc. for Polymer Corp.	1,829,213.	74,224.
Misc. Orders from Dept. M. & S.	22,129.	11,025.
Steam Turbines for Navy		513,340.
Total of Direct War Orders	$4,166,205.	$3,927,280.
Total business booked in year	$5,281,407.	$4,193,597.
% of Direct War Orders	78.8%	93.8%
(Figures for 1943 are for the first nine months of the year)		

(11) One of our factory buildings has been converted entirely to the manufacture of 40-mm. shells and changes in and additions to the machines and the machinery of the other buildings of our plant have been made to adapt our equipment to the production

> *of implements of war in particular boilers for minesweepers, engine generator sets and steam turbines for the Navy, boilers for the Polymer Corporation and, while these are similar to our peacetime products, their manufacture did make necessary, changes in our equipment and called for considerably increased supervision.*

Sales jumped from $1,770,000 for the year ended December 31, 1940 to $3,888,000 for the year ended December 31, 1943.

The war effort and/or the natural frugal instincts of the Company's management provided the opportunity for instituting certain wartime economies in the Company. Instructions related to these economies were issued in a letter to the office employees and that letter is reproduced here in its entirety for two reasons. First, it provides some insight into and feeling for the tenor and psychology of the times. Second, it is included here for the emulation and edification of current and future employees and as a source of ideas for future generations of managers looking for ideas for their cost reduction programs.

CIRCULAR LETTER

Office Wartime Economies

ADDING MACHINE TAPE

Insert each new roll carefully into the machine to avoid damage due to binding, wrinkling, and tearing.

Start the list of figures as close to top of tape as possible. Double space only when necessary.

Tear the tape immediately below the total.

Do not use tape for scratch pad notations; figuring and notes can be placed on the reverse side of used tape.

Use wider widths of tape only when necessary.

CARBON PAPER

Insert and remove carbon paper from typewriter carefully to prevent wrinkles and tears.

Keep platen and type bars of typewriter carefully clean to prevent excessive wear of carbon.

Turn carbon sheet top to bottom to get maximum use; if necessary, trim sheets to shift position.

Cut off unused portions of large sheets to be used for smaller work.

COMMUNICATIONS

Avoid the enclosure of clips, rubber bands and other items which will add to the weight of a letter.

1939-1947 BABCOCK-WILCOX & GOLDIE-McCULLOCH LIMITED
WAR YEARS

CORRESPONDENCE

Write briefly and to the point. Try to avoid the use of second sheets.

Use small-size memo sheets for intra-office correspondence.

Reduce the number of carbon copies to a minimum.

Single space all letters and reduce the margins.

Think twice before rewriting a letter due to some minor error.

ELECTRICITY

Turn off the lights when not required.

ENVELOPES

Use small standard size envelopes.

Don't discard used envelopes — split and stack them for scratch paper purposes.

ERASERS (Typewriter, ink, and pencil)

Use erasers down to the smallest stub.

Erase lightly and avoid unnecessary pressure.

Note: Rubber erasers will soon be practically impossible to obtain. This essential item, as well as other rubber products, such as rubber fingers, should be safe guarded against loss and misuse.

FILE FOLDERS

Do not discard file folders until they are beyond usefulness either by damage or brittleness caused by age.

FILES

Remove the paper clips and rubber bands before filing papers in permanent file.

MISCELLANEOUS

Avoid breakage of dictating cylinders and attempt to put as many letters as possible on one cylinder.

Use both sides of desk blotters before discarding them.

PAPER FASTENERS (clips, staples, pins, file fasteners, etc.)

Use the same clips and pins over and over again.

Remove clips from discarded papers and discontinued files.

Retrieve all clips from floor, desk, crannies, etc.

Use one staple instead of two or more.

Use staples only for completed papers — they can be used only once.

PENCILS

Use pencils until they are too small to hold.

Use extension holders so that pencil stubs can be used.

Sharpen pencils carefully. Only a few turns of a sharpener will sharpen the pencil.

Make every effort to avoid loss or misplacement of pencils.

Handle refill leads for mechanical pencils with extreme care to guard against breakage.

SALVAGE

Make scratch pads out of obsolete one-sided forms and discarded duplicated material. Some of this salvaged material can be used for informal office announcements, and bulletin notices.

TYPEWRITERS

Follow the rules of general care recommended by the manufacturer.

Adhere to a strict routine of daily and weekly cleaning schedules.

Most of the Company's production in support of the war effort was, with the exception of munitions, similar to its peacetime production. To facilitate the production of munitions, such as anti-aircraft and armor piercing rounds, part of the South Works was converted to this type of manufacturing and was placed under the management of James Biggar. By 1941, armor piercing two pounder rounds were being produced for the Canadian government at 25¢ per round.

In addition to supporting the war effort through the supply of munitions, the Company also supplied numerous boilers, engines, steam turbines, heat exchangers, and pumps for use in the war effort by such companies as Port Arthur Shipbuilding Company Limited, Redfern Construction Company Limited, Toronto Shipbuilding Company Limited, and Wartime Shipbuilding Limited. These wartime naval boilers constituted the Company's first recorded venture into the marine boiler business and included 3-drum Admiralty type and B&W straight tube units for Bangor and Algerine Mine Sweepers and for transport ferries.

As was the case in the First World War, the Company's records once again reflected the disruptive and tragic effects of war. Apprenticeship papers were annotated:

William O'Neill:... "Left to join the Armed Forces Nov. 30/43"
William Payne:... "Enlisted May 7/42"
Wm. Short:... "Left to join Air Force Jan. 29/43"
followed by:
"Reported to be missing on Active Service"
Donald Gardham:... "Left September 4th, 1943"
followed by:
"Killed in action"

There was other sad news to report during these war years. On Friday May 7, 1943, the Board of Directors of the Company met at the Company's offices in Galt. The meeting was attended by A. G. Pratt, Glyn Osler, A. R. Goldie, H. L. McCulloch, and W. A. Osbourne. The Board had the unhappy duty of passing the following resolution:

Resolved that the Board of Directors of this Company record the deep

> *sense of loss felt by all its members in the death of their chairman.*
> *Robert O. (Bob) McCulloch died May 5th, 1943. He joined the Goldie and McCulloch Company Limited in 1898 as its Secretary-Treasurer; became President of Babcock-Wilcox & Goldie-McCulloch Limited upon its formation in 1923 and Chairman of its Board of Directors in 1932.*
> *Mr. McCulloch's leadership embodied many outstanding qualities. His wide experience, his ability to see through a problem to a conclusion, his well considered advice and guidance, were of the greatest benefit to the Company. His deep interest in its affairs and his untiring energy were an inspiration to all those who were privileged to work with him. His fine personal traits and characteristics endeared him to all those with whom he came in contact, both within and outside the Company.*
> *We, the members of the Board of Directors of Babcock-Wilcox & Goldie-McCulloch Limited, have lost a dear and valued friend and associate: we shall always remember Robert O. (Bob) McCulloch and be happy that it fell to our lot to be so closely associated with such an outstanding and lovable individual.*

By 1944, certain aspects of the war effort were already winding down, and a November 24, 1944 newspaper article in *The Galt Daily Reporter* reported the following under the headline "B-W-G-M to Stop Manufacturing 'Ack-Ack' Shells":

> *Instructions have been received by Babcock-Wilcox & Goldie-McCulloch Limited, to discontinue the production of anti-aircraft shells, it was announced today.*
> *During the past four and a half years this Galt firm has produced over two and a half million shells for the famous Bofors anti-aircraft gun. Up till now the demand has been for the maximum which could be produced and it can only be assumed that the falling off in demand is another indication of the defeat of the German air force.*
> *Instructions were received yesterday from Ottawa, and communicated to all shop employees immediately by W. A. Osbourne, general manager, that need for supplies of these shells from the United Kingdom has been satisfied and, as a result, their production will cease in the local plant next month.*
> *It is understood that approximately 180 employees are affected by the shutting down of this plant, of which approximately 80 are men and the remainder women.*
> *The local office of the National Selective Service is co-operating in arranging for the transfer of workers to meet the demands from other industries.*

And finally, in 1945, Johnny McEwan's faithful notes in his shop workbook recorded the following:

> *"Unconditional surrender of Germany May 7/45 at 10 AM our time"*
> *"Unconditional surrender of Japan 7 PM Tuesday, August 14/1945"*

Although non-military business declined during the intensive war years of 1942, 1943, and 1944, a total of 270 boilers was built during the nine year period 1939-1947. The most popular units were small to medium sized integral furnace boilers in the 10,000 to 60,000 pounds of steam per hour range.

Babcock-Wilcox & Goldie-McCulloch Limited addressed this market under the guidance of Chief Engineer (and later President) R. M. Robertson by developing and marketing a new Type G boiler, which accounted for over 60% of the boiler units sold during this period. The first Type G boiler was sold to Proctor and Gamble of Hamilton in December, 1940. The G boilers could be either oil, gas, wood, or coal fired by underfeed, chain grate, or Babcock-Detroit spreader stokers, with or without superheaters, economizers, and air heaters. Type G boilers were particularly popular for hospitals and other institutional applications where their reliability and easy maintenance were a factor. Thirty-four units were sold in this era to food industry customers including Quaker Oats, Canada and Dominion Sugar, Swift Canadian, Libby, B. C. Sugar, Nabisco, Burns Foods, E. D. Smith, Ogilvie Flour, Christie, Canada Packers, and others. Textile, brewery, and rubber industry firms were also good customers for G boilers. The latter firms included Goodyear, Firestone, and Uniroyal.

A major contract award to supply large radiant type boilers was received in September, 1942 when Polymer Corporation Limited of Sarnia, Ontario awarded the Company an order for five pulverized coal fired units of 275,000 pounds of steam per hour with superheat steam. This contract was of importance to the Company for reasons beyond just the value of the contract itself. These pulverized coal boilers, which were large for their time, along with the large units installed in Toronto's Union Station and Royal York Hotel, were later cited as part of the experience base that justified the award of Ontario Hydro's Richard L. Hearn units to Babcock-Wilcox & Goldie-McCulloch Limited.

During this period, Babcock-Wilcox & Goldie-McCulloch Limited continued to develop its utility boiler business by supplying boilers to such customers as Saskatchewan Power Corporation, Canada Electric Company, City of Edmonton, Nova Scotia Light & Power, Maritime Electric, and Winnipeg Hydro. Units supplied were coal-fired Type F and Stirling boilers.

The pulp and paper industry went into high gear during this era and purchased over 20 boilers from the Company. Most notable of these were black liquor fired chemical and heat recovery boilers supplied to Crown Zellerbach, Consolidated Bathurst, and Marathon Corporation. Other customers included Abitibi Power & Paper, Price Company, Domtar Newsprint, E. G. Eddy, Rayonier, and Rolland Paper Company.

An unusual order was received in 1946 to manufacture 35 Cleaver Brooks package firetube boilers for Waterloo Manufacturing Company Limited, the Canadian licensee of Cleaver Brooks. This experience may subsequently have been used to advantage in 1960 when Babcock-Wilcox & Goldie-McCulloch Limited introduced its own Steambloc self-contained firetube packaged unit.

Other products supplied during the period 1939-1947 included literally hundreds of centrifugal pumps, particularly for the pulp and paper industry, as well as steam turbines, air compressors, vertical high speed engines, custom castings, and cast iron feed water heaters. And on December 31, 1947 the Company bought the business and certain of the assets of the Detroit Stoker Company in Canada.

In spite of the war effort, the war years were a period of labor unrest. Strikes were taking place in many industries in the neighboring cities of Ontario, and also in the rest of Canada, the United States, and Great Britain. The war in Europe was reaching a crucial point and the tide was at last beginning to turn against the Germans and Italians in Europe.

An article in the *Galt Daily Reporter* of February 7, 1943 was headed "Labor Dispute in Galt – Strike Vote Taken". This news item went on to explain that Arthur Williams, an organizer for the United Steel Workers of America, was attempting to organize all the steel workers at eight plants in Galt, including Babcock-Wilcox & Goldie-McCulloch Limited. He claimed that 80% of the workers in the company were in favor of having the United Steel Workers of America recognized as sole bargaining agent for the two plants. The union wanted all employees who were not already members to join it within six weeks of an agreement, and all future employees to sign up within a month of the date on which they were hired. The company would be obliged to deduct $1.00 in union dues from each monthly pay packet.

W. A. Osbourne, Vice President of the company, handled the dispute for Babcock-Wilcox & Goldie-McCulloch Limited. He claimed that under the proposed agreement the workers would have no democratic right to approach management on an individual basis. Furthermore, there was no concrete evidence of grievances at the plant and the satisfactory output of war material seemed to indicate that the employees were happy. The company objected to having one union represent all the employees and would not agree to the check off of union dues.

On February 8, C. H. Millard, National Director of the Steelworkers Union, came to Galt to address a mass meeting of workers at the Palace Theatre. His theme was that "Galt must not be a stumbling block to uniting the workers of Canada for whom the union wanted to bring reforms in working conditions".

Meanwhile the manufacturers of the eight Galt companies effected formed a committee and had a special newspaper printed and distributed to 2,500 workmen's homes, explaining their viewpoint and assuring the workers that unionization would not bring them security.

The union then made six applications to the Ontario government for the establishment of boards of conciliation. At the same time the Ontario Legislature was debating the whole question of collective bargaining.

By March 19, 1943, the Minister of Labour of the Federal government had appointed special commissioners to investigate cases where applications for boards of conciliation had been made, and on March 29th Judge James Parker was appointed to consider the labor disputes in Galt.

A board of conciliation opened hearings at Galt City Hall on April 5th. The

Babcock-Wilcox & Goldie-McCulloch Limited company union made the first presentation. This union, called the Babcock-Wilcox & Goldie-McCulloch Employees Association, had been formed on March 15 and had a membership of 144.

In its presentation, the Babcock-Wilcox & Goldie-McCulloch local of the United Steelworkers expressed the desire of the men for job security and job classification. Wages were controlled at that time by the Wartime Prices and Trade Board of the Canadian government and were not in question.

Management in its turn expressed the opinion that there was sufficient contact between it and the workers through the company's Benefit Society and that U.S.W.A. would not be representative of the employees and had besides a bad reputation. The company was willing to have a company union and workers were free to choose between it and the United Steelworkers. But collective bargaining and a check off by the U.S.W.A. was not acceptable.

The employees of the eight struck companies apparently applied to Mayor Serviss to ask for a detachment of Provincial Police to be sent to Galt, although there had been very little violence.

The Federal and Provincial authorities appeared to be stalling during the long interval in April and May. Tension grew and a few arrests were made. Williams travelled to Ottawa to try to persuade the Minister of Labor to hasten proceedings and predicted a general strike in Ontario if the matter dragged on. He reported that "Goldies is the key plant of the Galt strike, we recognize it and so does the government".

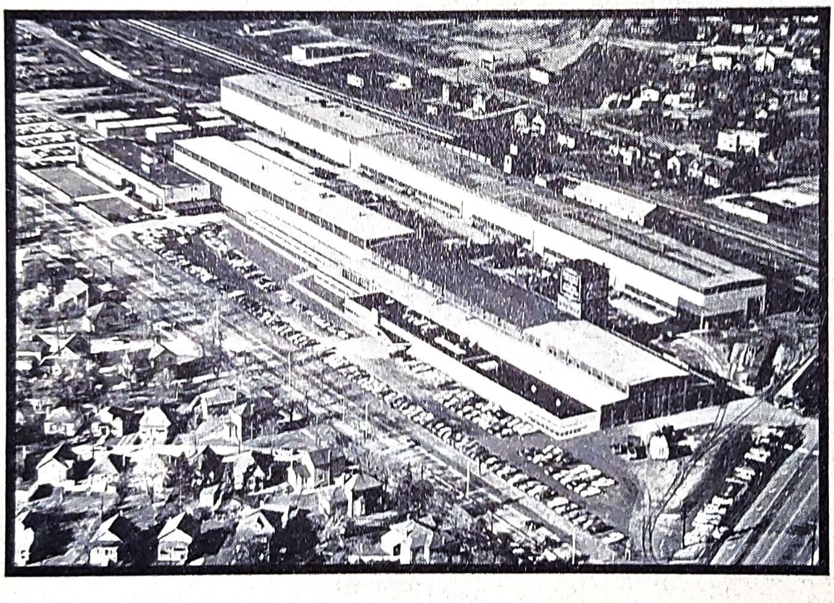
Finally on July 12, Babcock-Wilcox & Goldie-McCulloch Limited asked the Labor Court to expedite the hearing of its case. Mayor Serviss then called a meeting of all strikers, of whom 204 were from Goldie, and suggested that the men return to work while awaiting the decision of the court. The company in turn promised not to discriminate against returning strikers. The strike committee refused to go back to work.

The court finally ruled that a vote must be taken among the workers by July 30 to decide which union they wanted to represent them.

When the results were counted, 210 workers voted for the company's Employees' Association (union), 174 for the United Steel Workers of America, 31 for neither, and 50 "were ineligible because they were on strike while the conciliation board had the matter under consideration". And thus the Employees' Association won the right to represent the Company's employees in collective bargaining, and it continued to do so until it was in turn replaced by the Canadian Steel Workers Union.

CHAPTER
6

1948-1967



Aerial view of North Works c. 1965

BABCOCK-WILCOX & GOLDIE-McCULLOCH LIMITED POSTWAR YEARS

OVERVIEW OF PERIOD

In the 35 years prior to 1948, there were two world wars and a great depression. The world then embarked on twenty years strong economic growth and relative stability notwithstanding the fact that they were punctuated by the Korean and Vietnamese Wars. To give a flavor of that time, below is a short retrospective of key events in Canada and the world.

	CANADA	WORLD
1948	Louis St. Laurent becomes Prime Minister	State of Israel is proclaimed
1949	Newfoundland becomes the 10th province	The USSR tests its first A-bomb
1950	Canadian troops sent to Korea	Korean war starts
1951	Old age pension plan adopted	Winston Churchill leads the Conservatives to victory
1952	CBC makes first TV broadcast	Eisenhower becomes president
1953	Stratford Festival opens	Joseph Stalin dies; Coronation Queen Elizabeth II
1954	Marilyn Bell swims Lake Ontario	Salk polio vaccine released
1955	Maurice Richard suspension causes riot in Montreal	Warsaw Pack signed by eight communist nations
1956	Diefenbaker becomes leader of the Conservative Party	Russians crush uprising in Hungary

	CANADA	WORLD
1957	Lester Pearson wins a Nobel Peace Prize	Russia launches Sputnik; European Common Market established
1958	Diefenbaker becomes Prime Minister with a majority	Alaska becomes 49th U.S. state
1959	The St. Lawrence Seaway opened	Fidel Castro takes power in Cuba
1960	Parliament passes the Bill of Rights	John F. Kennedy elected president of the United States
1961	NDP party formed with Tommy Douglas as leader	Berlin Wall is built; Bay of Pigs invasion of Cuba; Yuri Gagarin becomes first man in space
1962	Trans Canada highway is completed	Cuban missile crisis; Marilyn Monroe dies
1963	Royal Commission on Bilingualism and Biculturalism	JFK assassinated in Dallas, Texas
1964	Maple Leaf flag adopted	Kruschev replaced in USSR; Martin Luther King wins Nobel Peace Prize
1965	Canada and U.S.A. sign auto pact	Watts race riots; Massive blackout on east coast of North America
1966	Canada Pension Plan goes into effect	Indira Gandhi becomes Prime Minister of India; France leaves NATO
1967	Expo — Man and his World	The six days war between Israel and Arab neighbours

Canada and the United States emerged into this postwar period in

1948 as victors, unscathed by World War II, and possessing much of the industrial might and wealth of the world.

In this postwar period Canada was transformed. Comfort and security ceased to be the sole right of the rich. It became possible for the majority, for the average citizen, to have a house, a car, some savings, and some expectations. For the first time Canada could afford old age pensions, family allowances, and prepaid health insurance to guard the average man against sudden disaster. And there was the expectation that every year things would get better.

In Galt, Babcock-Wilcox & Goldie-McCulloch Limited grew strongly in this favored climate. Between 1950 and 1966 Babcock-Wilcox & Goldie-McCulloch Limited sales went from less than $5 million to over $30 million, a sixfold increase. Profits also increased threefold. This was possible, despite heavy competition in the industry, because there was enough work for everyone to prosper.

To understand this era and the life of the company it is necessary to examine some major trends.

Until the postwar era, most of Canada's electricity could be supplied by hydraulic power. After the war, fossil power became increasingly important as demand grew rapidly and available hydraulic sites fewer and more remote. This was true especially in Ontario. Orders for central station boilers became more commonplace. By 1956, the trend was becoming apparent to Babcock-Wilcox & Goldie-McCulloch Limited. The 1956 Annual Report of the President stated:

> *It is worthy of note that of this total volume, over 40% was accounted for by three contracts, namely Hydro Electric Power Commission of Ontario, Saskatchewan Power Company, and Calgary Power Company. This indicates the increasing importance of the Public Utility plants and of Thermal generation in that field in Canada.*

The trend continued and in 1958 an internal company document noted:

> *In 1958, as in recent years, public utilities purchased more than half the total amount of boiler business in Canada... The next largest buyers were the petrochemical and pulp and paper industries which accounted for some 14% and 9% of the total business...*

By 1963, the utility business dominated the company's activities. A President's Report dated April 9, 1964 noted that:

> *The peaks and valleys in our booking, net profit, production and backlog are directly tied to that business; all our other activities, except pulp and paper work, are minor in comparison to utility boilers.*

The trend continued and Babcock-Wilcox & Goldie-McCulloch Limited noted that "total bookings for 1967 were $55 million dollars, 78% of which was in utility boilers – and nearly all of that in the Ontario Hydro Nanticoke order." Ten years later, in 1977 management would voice the same concern, as the utility business was still 80% of the company's production. In 1987 the situation remains substantially the same except that the utility boilers are destined for export to China, Indonesia, and Egypt, rather than Canada.

The Company recognized early the dangers of over-reliance on utility boilers as the mainstay of the business. This recognition led to a major attempt at diversification in the late 1950's and early 1960's. The competition was doing it and Babcock-Wilcox & Goldie-McCulloch Limited also entered the arena. The major areas of diversification were:

- The pump and turbine business
- The Steambloc enterprise
- The water and sewage business
- The Detroit-Vibragrate-Taylor stoker business
- The crane and ash and coal handling business
- The Yuba heat exchanger business

By and large these diversifications were not successful. The reasons are many and vary by industry but it may be generally said that the skills needed for success in the boiler business apparently did not transfer well to these other product lines. The Company recognized this and in 1961 an internal document noted "Here we find the going difficult, largely due to lack of enthusiastic and enterprising staff."

Capsule comments (1961) about these various diversifications are instructive:

> *The Pump and Turbine business in 1961 had Sales of $1,250,000 approximately and a gross profit of about $72,000... Its operating expenses resulted in a loss of $85,000. ... This is an extremely competitive field, requiring very careful judgement of the jobs which should be fought for.*
> *The Steambloc enterprise is not satisfactory, due to lack of sales, which is entirely a marketing problem. ... We have been getting only a very minor share of the business available due to inept sales effort and promotion.*
> *Our Sewage business also has been slow in getting off the ground... We booked about $150,000 worth of business in this field in 1961.*
> *The Detroit-Vibragrate-Taylor stoker business has been short of orders due to lack of demand for stokers but has shown very satisfactory profit margins for what business we have had...*
> *The crane and ash and coal handling business is very depressed*

> *throughout Canada. We have bid on occasional less competitive jobs and find prices often will not cover our labour and material costs.*
>
> *We still have working arrangements for Canada with Yuba Corporation for heat exchangers...although only a few heat exchangers have been built...those were very profitable.*

Each of these diversification efforts is a story unto itself. Each tended to flourish for a while then die a quite competitive death. It may be fair to say that the heart of the company was never totally committed to these efforts, seeing them as a "filler" to the real business of building big boilers. One quotation clearly illuminates this:

> *While the foregoing [diversification list] makes quite a list for one sitting, the projects will not be unduly difficult to handle. All of them together will never take the place for us of one or two utility boiler contracts per year, which over a long term is less than this country will require.*

Sadly, but predictably, all of these enterprises withered and died within a few years.

As of December 31, 1951 Babcock-Wilcox & Goldie-McCulloch Limited employed a total of 400 people. By 1967 this had increased to a total of 1130 people, 430 salaried and 700 hourly.

From 1951 to 1967 Babcock-Wilcox & Goldie-McCulloch Limited made a net profit each year. The figure varied tremendously depending on circumstance from a low of about $100,000 in 1956 to something over $1,200,000 in 1967. This had a positive effect on the company's net worth which increased from $2.5 million in 1950 to $12 million in 1967. Beyond the dollar figures, this unbroken string of successful years gave the company the confidence and wherewithal to pursue both diversification and expansion.

The hallmark of the twenty years between 1948 and 1967 was stability. Wages were stable, the work force was willing, inflation was no threat, interest costs were reasonable, and orders were for the most part plentiful.

Labour availability became a major issue in the mid 1960's. In 1964 the president, commenting upon the drafting department, noted that:

> *Draftsmen are in very short supply and are commonly better paid than professional engineers of equal vintage. We are just opening a main drafting room in Toronto, to take advantage of the labour pool which will rather increase our engineering expense, but will get our work done.*

He continued:

> *It has cost us about $80 per man gained, for shop recruiting during the last year. Shortage of help of every kind is widespread*

> *in Ontario; raiding from outside towns and cities is constant and well organized. We do as much as possible ourselves; it is a losing game.*

By 1966 Babcock-Wilcox & Goldie-McCulloch Limited tried recruiting overseas.

> *...the shop hourly work force still lacks skilled help in common with all district industry. A recent recruiting campaign in the British Isles has produced several dozen skilled mechanics for us.*

Within one year the situation had eased and there was even a hint of trouble from a new quarter, the consulting engineers.

> *There has been no difficulty in obtaining good shop help in the last 6 months, while improving manufacturing methods have eased the requirement... Business is becoming more difficult to carry out, due to the increase in incidence and ineptitude of consulting engineers, to be turned to our advantage, eventually.*

The boiler business in Canada was dominated by three competitors. Each competitor had its own approach to the market. Combustion Engineering coveted the utility field, Foster Wheeler the industrial market and Babcock-Wilcox & Goldie-McCulloch Limited believed in being a full line supplier. Over the years others tried to enter these markets, but with limited success.

In 1959, an internal document noted:

> *John Thompson of England continue their strenuous efforts to break into this market and doubtless in time... will have some success. While the latter has closed its Canadian boiler plant, it is still vigorously soliciting business on the basis of English manufacture and local subletting.*

A report 2 years later stated that:

> *John Thompson of England, having failed to enter the Canadian boiler field... have now joined with Dominion Bridge Company and show signs of bidding on major boiler units. If and when this combination is able to develop Canadian staff and know-how, their competition will be very serious, in view of the power and standing of Dominion Bridge in Canada.*

It was a needless worry as this competitor never seriously threatened the triad.

Overall, Babcock-Wilcox & Goldie-McCulloch Limited felt its most competitive pressure from Combustion Engineering. This was very apparent in 1964 and 1965.

> *Combustion's present ascendency in the large utility business is*

> *primarily due to price. The Lambton 500MW boilers are in the 2500 pound design range, where it seems our UP-boiler is not competitive in price...*

and,

> *Our competitor, Combustion Engineering, whose long standing policy has been to take only a few large jobs and ignore the small and moderate sized ones, is thus able to give the few customers they have, better attention than we can give ours with a bigger staff.*

The reality is that the triad was remarkably stable over a twenty year period as shown by the following chart.

	COMPETITIVE STANDING (% of dollars booked)	
	1958 - 1967	**1968 - 1977**
Babcock-Wilcox & Goldie-McCulloch Limited	39 %	37 %
Combustion Engineering	42 %	48 %
Foster Wheeler	9 %	12 %
Others	7 %	3 %
Total Dollar Volume	**$ 485 Million**	**$ 1,079 Million**

For ten years after the war, there was virtually no thought of exports as Canadian domestic needs drew the company's full attention. But in 1958

> *...a proposal has been made to us respecting formation of a trading association by which, with the Canadian Government's approval, if not active assistance, it may be possible to develop Canadian export business with soft-currency countries by taking advantage of import credits they build up in Canada. There may be an opportunity in this development for us to obtain some steam generating business.*

Even three years later Babcock-Wilcox & Goldie-McCulloch Limited noted tiredly "the export field did not result in any business for us except one wood-fired unit for Brazil."

Surprisingly, Combustion Engineering and Foster Wheeler began to have significant export success making Babcock-Wilcox & Goldie-McCulloch Limited somewhat envious. In 1963 the president's report noted that:

> *...in the Canadian export field, as reported in detail for previous meetings, Combustion Engineering's business far exceeds that of Foster Wheeler and ourselves combined; Foster Wheeler (alone)*

> *have more than twice as much business as we. . . It appears. . . that Combustion Engineering Corp. have secured about $9,175,000 of export work, Foster Wheeler about $1,665,000 and we have secured about $750,000 worth.*

Then came the rationalizations.

> *However, it is commonly known in Canada that the majority of Combustion's export business has been simply transferred to them by their principals to give their Canadian shops work. Also, Foster Wheeler have lately published an article describing their organization's world-wide co-operative efforts to secure export work for their family, which indicates allocation of these jobs, rather than competition within their group.*

In response to its competitors' successes, the Company took some tentative action to change the situation. 1964 report noted: "We are gradually building up our contacts for export markets particularly as it offers a higher profit margin than domestic business."

By 1965 the Company noted that "Foster Wheeler Canada are doing a thriving business in South America. We are about to make a detailed survey of that territory to develop means of getting this business away from Foster Wheeler."

Two years later the Company was gradually increasing its knowledge of the export markets and had acquired "a number of energetic agents" in South America, New Zealand, and Australia.

By the time Expo opened in 1967 marking the country's centennial, it found Babcock-Wilcox & Goldie-McCulloch Limited not yet in the export business but actively seeking to join.

COMPANY OPERATIONS

During the period 1948-1967 the day-to-day operation continued to progress. Although it probably wasn't apparent to the Company's employees at the time, the year 1948 was to mark something of a turning point in the Company's development. That was the year in which the Company received the order for the first two units of Ontario Hydro's J. Clark Keith Station in Windsor, Ontario. The order was significant in that it marked the first in a long string of multiple unit projects, both fossil and nuclear, that the Company performed for Ontario Hydro, the Company's leading customer for nuclear and fossil boilers for the next 30 years.

The J. Clark Keith Station was a four unit station consisting of four 66MW units firing pulverized eastern bituminous coals. All four units were ultimately supplied by Babcock-Wilcox & Goldie-McCulloch Limited. Units 1 and 2 were ordered by Ontario Hydro in 1948 and were commissioned in January 1952. Units 3 and 4 were ordered in 1951 with Unit 3 being commissioned in October 1953, and Unit 4 in February 1954. These four units are two drum Stirling boilers with pendant superheaters and a design pressure of 1000 psi. Unit output is 650,000 pounds of steam per hour at a superheater outlet temperature of 900°F. Operating pressure was 875 psi. The units fired pulverized coal utilizing four E-56 pulverizers. Unit construction included a tangent tube furnace with primary steam temperature control through spray attemperation.

The Keith units were mothballed by Ontario Hydro in 1976 for economic and environmental reasons but were recommissioned in 1980. In the twenty-five years of operation before the units were mothballed in 1976, they had been fired for about 80,000 hours.

The first orders for the Keith Station were followed quickly by orders in 1949 for the first two units of the Richard L. Hearn Station.

The Hearn Station, located in Toronto, was eventually to be an eight unit station consisting of four 100MW units and four 200MW units firing pulverized Eastern bituminous coals. Six units were supplied by the Babcock-Wilcox & Goldie-McCulloch Limited: the four 100MW boilers and two of the 200MW boilers. The other two 200MW boilers were supplied by Combustion Engineering.

Units 1 and 2 of Hearn were ordered by Ontario Hydro in 1949 and were commissioned in September 1952. Units 3 and 4 were ordered in 1951 and were also commissioned in September 1952. These four units were two-drum Stirling boilers with pendant superheaters with a design pressure of 1000 psi. Unit output was 850,000 pounds of steam per hour at a superheater outlet temperature of 900°F. Operating pressure was 875 psi. The units fired pulverized coal utilizing four E-70 pulverizers. Unit construction consisted of a tangent tube furnace and primary steam temperature control was through spray attemperation.

Units 5 and 8 at the Hearn Station were ordered in 1956 and 1957 respectively with commissioning of these units being completed in April and November 1961 respectively. (Units 6 and 7 went to Combustion Engineering.) The Babcock-Wilcox & Goldie-McCulloch Limited units were radiant single drum boilers with fully drainable superheaters and reheaters with a design pressure of 2200 psi. They were each capable of producing 1,350,000 pounds of steam per hour at 1000°F at the superheater and reheater outlets. Operating pressure was 1900 psi. Both units fire pulverized coal using six EL-70 pulverizers. The primary steam temperature control on the units was gas recirculation. The units were of tangent tube construction in the furnace.

On the employee benefits front, the company adopted its first formal pension plan on April 1, 1949. The plan covered both salaried and hourly workers and specified normal retirement ages ranging from 65 to 75 years of age depending on the employee's age when the employee became eligible to join the plan.

Being a partially owned subsidiary of the British and American companies, Babcock-Wilcox & Goldie-McCulloch Limited did on occasion receive recognition in the house publications of those companies. In about 1950, the British company ran an article describing the Canadian company and its facilities and products. In describing the living conditions of the employees of Babcock-Wilcox & Goldie-McCulloch Limited, the article said:

> *Most of them own their own homes, have attractive gardens and lawns, and enjoy life in this thriving industrial city.*

These observations were made, we suppose, to dispell the prevailing opinion in Britain that the poor lawnless colonials lived in teepees in the dense forest during the summer and in igloos on the ice pack during the winter (which any educated Englishman knew lasted from September to June in Canada).

In May of 1950, A. G. Pratt submitted his resignation as a director of Babcock-Wilcox & Goldie-McCulloch Limited. In accepting the resignation of Pratt, who had served for 24 years as president of the American company, the Board noted:

> *Moved by A. R. Goldie, and seconded by Hugh L. McCulloch and carried, that the Board of Directors wish to record their deep appreciation of Mr. Pratt's faithful services to the Company. He acted as Chairman of the Board from 1923 to 1932, and as Chairman of the Executive Committee from 1932 to 1949, and during all of these years, his wise counsel and constant consideration of the Company's many problems was invaluable. We are delighted to record that Mr. Pratt has indicated that the Company will have benefit of his continued interest in its future affairs.*

Babcock-Wilcox & Goldie-McCulloch Limited continued its drive into the utility export market in 1951 with a contract to supply two 2-drum Stirling boilers, each of 850,000 pounds of steam per hour capacity, for the Sao Paulo Light and Power Company of Brazil.

Alexander Rodgers Goldie died on November 9, 1951, ending a long career with the Company dating from 1893. The Board of Directors noted as follows:

> *The Board of Directors of Babcock-Wilcox & Goldie-McCulloch Limited, record with deep sorrow and a feeling of personal loss, the death on November ninth, nineteen hundred and fifty-one, of their long time associate and friend*
>
> *Alexander Rodgers Goldie*
>
> *On his graduation from college in 1893, Mr. Goldie entered the employment of Goldie-McCulloch, Ltd., and his ability was such that he was made Vice-President and General Manager in 1897.*

> *When that company joined with Babcock & Wilcox in 1923, he occupied the office of Vice-President until 1932, President 1932-1934, the Chairman of the Board from 1934 until the time of his death. Throughout his service of fifty-eight years, his contributions to his company were outstanding and added much to its growth and success.*
>
> *Alex Goldie was a man who held strong opinions, but one who could always be counted upon to weigh the opinions of others before arriving at conclusions. His high moral character, his friendliness, and his sense of humor endeared him to all who knew him. He will be greatly missed and his memory long cherished by those who were associated with him.*
>
> *The Board extends its sincere sympathy to Mrs. Goldie and the members of the family in their loss and sorrow and directs that a copy of this memorial be presented to her and that it also be recorded upon the minutes of the Company.*

On November 16th H.L. McCulloch succeeded A.R. Goldie as Chairman of the Board and W.A. Osborne was appointed President. Fourteen months after Goldie's death, John McEwan's notebook recorded its last entry relative to the Company's former superintendent:

> *Carl Johns died January 12, 1953*

Several members of the present staff of Babcock & Wilcox Canada, as well as some retirees, have vivid memories of the South Works during the 1950's. The drafting office of the old building was, according to Clare Williams, (now retired), "the hottest, darkest room in Galt, until new light fixtures were installed". In his first year (1940) he remembers working from 8 a.m. until 5 p.m. as well as Saturdays, and making $90.00 a month.

Another current employee, who joined the business office staff at the South Works as a stenographer in 1952, remembers what conditions were like then. The office was old fashioned and rather shabby with well worn furniture and none of the office equipment considered basic today. There was no copier of any kind, and typewriters were all manual. All work had to be perfect, although in those days specifications went out without numbered pages or illustrations, as was the custom generally at the time. The vault, where records and correspondence were kept, and which had a gallery, was scrupulously kept. The telephones were not answered by the secretaries but went directly from the switchboard to the person concerned. The office staff found J. S. E. (Mac) MacAllister, Executive Assistant, a very exacting man to work for and he intimidated many. However, he appreciated good work and devotion to duty and would reward the conscientious with an extra few dollars for overtime work and a larger bonus at Christmas.

The memories of Mac MacAllister by one of the Company's current salesmen are quite affectionate. He too admits that Mr. MacAllister was somewhat crusty; however, when that salesman worked under Mr. MacAllister in his Sales Department as proposal and contract manager, he realized what a splendid salesman Mac was. Mas was indeed demanding, but he kept the Company busy with contracts. He and Mr. Robertson joined "Goldies" at about the same time and when Mr. Robertson became President in 1959 they really ran the Company as a team.

The new office building at the North Works was built in 1955, the architects being Page & Steele of Toronto and the contractors Ball Brothers of Kitchener. The completion of the new office building in December of that year allowed the relocation of most of the office staff from the South Works on Grand Avenue to the new location on Coronation Boulevard.

The Company's credit union was also formed by staff members in 1955.

The year 1955 was also a significant one in the Company's development of industrial and utility steam generating equipment. Babcock-Wilcox & Goldie-McCulloch Limited supplied the first CO boiler in Canada to Imperial Oil Limited for their Dartmouth, Nova Scotia refinery. In December, Nova Scotia Light and Power purchased the first cyclone furnace boiler manufactured in Canada, and subsequently ordered another 450,000 pounds of steam per hour unit early in 1956.

The Company's engineers had been working closely for some time with Canadian General Electric and Atomic Energy of Canada Ltd. on the development of nuclear equipment. This development effort was to have very important consequences for the Company as early as 1956, when the first order for nuclear equipment was received. This order was for a heat exchanger for NPD II at Chalk River, Ontario, the first of many contracts for nuclear equipment to be supplied by the Company.

A large addition to the North Works, a tube shop 400 feet by 70 feet, was constructed under the supervision of the Company's own engineers in 1957. In an interview given to *The Evening Reporter*, the Company's president, W. A. Osbourne, explained that:

> *The increasing size and number of generating units and other large pressure vessels now being produced by the Company have necessitated these additional manufacturing facilities which will relieve the congestion in the existing heavy drum and tube shops.*

The Progress edition of *The Evening Reporter* of February 1958 described the split of work between the North and South Works as follows. The South Works was making power plant equipment, including chain grate and travelling grate stokers and Detroit underfeed and spreader stokers, Babcock-Wilcox & Goldie-McCulloch Limited coal pulverizers, centrifugal pumps, steam turbines, and a wide variety of heavy machinery. The North Works:

> *...is the main boiler shop equipped to machine all drums and*

> *headers and in the tube shop, the bending of boiler and superheater tubes and pipe is accomplished and assembly of these items, and plate work is done. Air heaters and economizers are also made in the plant as well as general plate, structural work and larger welded frame assemblies for stokers.*

Ontario Hydro began building its Lakeview thermal power plant in 1958 and Babcock-Wilcox & Goldie-McCulloch Limited eventually supplied six 2,000,000 pounds of steam per hour radiant boilers for this steam power plant, which was one of the largest in the world at that time. Once again, Combustion Engineering won two units of what was eventually to be an eight unit size.

R. Morton (Mort) Robertson became president of the Company in January, 1959. He had joined Babcock-Wilcox & Goldie-McCulloch Limited as a young engineer in 1934 and subsequently held several senior positions with the firm before becoming President. As Mr. Hugh L. McCulloch was Chairman at that time, Mr. Osbourne became Vice Chairman of the Board after his term as President.

At the September 1959 meeting of the Board of Directors the new President gave a report to the Board that is worth repeating here in part because it gives a good feel for business conditions at the time and for the scope of the Company's activities. Excerpts are as follows:

> *These results reflect the existing state, and trend, of our business, in which there have been no inquiries for large utility boiler jobs so far this year (until the last few days when two tenders have been invited), while the smaller boiler business which is also scarce involves desperate competition and some newcomers from overseas. Our pump and turbine business has made great progress during the year but very low prices due to intense competition here also, have driven down our profit margin.*
>
> * * *
>
> *In view of the low mark-ups on the business we have taken — and we have been careful to take this as selectively as possible — we have been cautious and conservative in taking up profits on uncompleted contracts and our statements contain substantial provision against difficulties in completing shop, erection and guarantee work on these contracts.*
>
> * * *
>
> *Selling and Administrative expenses show an increase of about $30,000 over the corresponding period in 1958, chiefly due to the increased payments under our new technical aid agreement with Babcock and Wilcox Company.*
>
> * * *
>
> *Our bookings up to September 22nd amount to $9,208,400. Of*

this, $552,400 is repair part business, slightly less than for the first 8 months of 1958, and $1,057,000 is pump and turbine division business, which is several times that for all of 1958.

Of the boiler business placed in Canada so far this year, amounting to about $8,000,000, (exclusive of our Navy contracts worth $3,445,660) we have obtained about 40%; Foster Wheeler about 23.5% and Combustion Engineering about 4.0%; Dominion Bridge and Canadian Vickers about 8.5% each. No large boilers have been sold in Canada in 1959, although we have just received an order for a 275 ton recovery unit for installation in B.C. which is the largest boiler order placed in Canada this year.

* * *

Of all the larger boiler orders obtained this year, only the recent black liquor unit carries a satisfactory mark-up and the ruthless price competition extends to all companies and all other boiler jobs with no sign of improvement.

For the first 8 months of this year, the total of bookings of boilers in Canada was 5,500,000 pounds, about 47% of 1958 bookings 41% of 1957 and only 34% of those for 1956 so that there is not enough business to go around and hence the ruthless price competition. Were it not for the Navy contract, and our pump and turbine business, our 1959 bookings and future shop load and burden position would be much worse.

As far as we are able, we have taken boiler and pump orders selectively so as to conserve our staff and resources for the time when more attractive business may appear. Meantime much emphasis is being placed on cost reduction and some improvement is evident, particularly in erection.

Our Pump and Turbine bookings, as noted, at $1,057,000 to date are several times greater than the 1958 bookings of $270,000. Two contracts for large sewage pumping installations are responsible for much of this volume but sales of industrial pumps have made very good headway, particularly with paper mills. The price situation is as difficult as in the boiler field although the pump division is self supporting and is steadily increasing its personnel and its product range.

* * *

The proposed arrangement for manufacture being investigated with The Marion Power Shovel Company has reached the point, after thorough joint study, where Marion have been urged to make us a more generous offer since present proposals provide us too little profit to be attractive. With present business conditions in that field it is unlikely much progress can be made at the present time.

* * *

Recently, we signed an agreement to run for 5 years, for the

> *manufacture and sale in Canada of the Wanson Steambloc boilers; manufacturing drawings and information have been received from Babcock and Wilcox Limited and work has begun here on an initial stock order for 6 boilers of about 250HP to 300HP which we believe can be readily sold by our existing sales staff.*
>
> * * *
>
> *While business conditions for all our products continue to be very severe, and profitable operation difficult, our organization is adapting itself well to these circumstances so that we can compete with some profit even under present conditions and become stronger and more efficient as the result.*

Looking back from the perspective of 1987, one is tempted to observe that the more things change, the more they stay the same.

The Steambloc boilers referred to above were fully automatic, three pass, horizontal firetube package boilers that were designed for oil, gas, or combination firing. The Company sold 275 to 300 of these units in sizes ranging from 20HP to 400HP from 1960 to 1965. The following excerpt from an internal memo by R. M. Robertson written in 1961 gives some insight into how they became involved with this design of boiler.

> *Over the next couple of years (after May 1957) we had cursory discussion with Babcock and Wilcox Limited respecting this type of business in Canada, since Babcock and Wilcox Limited had a manufacturing arrangement with Wanson of Belgium, sponsor of the Steambloc boiler and considered this should be extended to Canada and, naturally, to us.*
>
> *On June 20th, 1959, Wanson wrote Babcock and Wilcox Limited that he was visiting Canada early July to discuss a license for Steambloc with Volcano Company but would give us preference and suggesting Babcock and Wilcox Limited indicate this to us and that we should discuss the matter with Wanson on his visit.*
>
> *Mr. McNeil, Managing Director of Babcock and Wilcox Limited, attended our Board Meeting the end of June, 1959, and arranged that we should have Wanson visit Galt, which was done July 7, 1959, at which time agreement was reached with Wanson that we should manufacture and sell the Steambloc boiler under a license for Canada.*
>
> *Our actual design work on the Steambloc boiler began the end of August, 1959 on receipt of guidance drawings from Babcock and Wilcox Limited, sent us the end of July, and on September 9th, 1959, instructions were issued in our organization to begin engineering, procurement and manufacture of the first Steambloc boilers.*
>
> *The European Steambloc design did not suit recognized and*

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>
> *The European Steambloc design did not suit recognized and*

> *accepted North American standards as to sizes and its detail design was excessively elaborate and complicated for economical production here. Thus it was necessary to design a modified Steambloc to correct this but the basic features such as Wanson's burner arrangement and the 3 pass boiler, were retained.*
> *This initial Canadian Steambloc design, now known as Mark I, proved excessively expensive and after 29 boilers had been sold, was discontinued.*
> *Mark II replaced it in early 1961, being far cheaper and very greatly simplified in detail construction — but still retaining the basic Wanson features of 3 passes and burner arrangement.*

The 1960's was a period of remarkable expansion for the Company during which it nearly doubled its business, while at the same time pioneering in the nuclear field in Canada. By 1960 the Company was listing nuclear reactor vessels and nuclear power heat exchangers at the top of the list of advertised products.

The following explanation appeared in the *The Evening Reporter* of February 29, 1960 for the enlightenment of the layman.

> *...At the North Works on Coronation Boulevard the highest engineering, welding and other skills are brought together in a special clean section of the plant for the manufacture of the heat exchanger for the nuclear power demonstration reactor being constructed by AECL, Canadian General Electric, and Ontario Hydro at Rolphton, Ontario. Working closely with metallurgists from International Nickel, Galt's engineers and skilled workers have made their contributions to the development of techniques for using new alloys that contribute to greater power production, not only from nuclear, but also from conventional fuels. They have met and solved the problems of delicate welding jobs involving these alloys and precisely assembled components; of drilling them through depths as great as eight inches, to tolerances so small as to be almost non existent, by the adaptation and improvement of techniques of gun barrel drilling.*

Although the Company first entered the marine boiler business in World War II, significant levels of activity in this field did not begin until 1950 when the firm was awarded the contract to supply the main propulsion boilers and auxiliary service boilers for seven DE 205 Class RCN destroyer escort vessels. This program was repeated in 1953 for seven more (DDE 257 Class) vessels and again in 1959 with six more (DDE 261 Class) ship sets. The main boilers were of a selectable superheat type designed by Babcock and Wilcox Limited (UK) to Admiralty specifications. The first two boilers were fabricated by Yarrows of Glasgow for Canadian Vickers and installed by Babcock-Wilcox & Goldie-McCulloch Limited. Subsequently, 52 main and auxiliary boilers were manufactured in the Company's Galt shops. The larger double cased main units of 135,000 pounds of steam per hour capacity were assembled and tested, and then dismantled for shipment and installation at various shipbuilding yards including: Canadian Vickers, Montreal; Halifax Shipyards, Nova Scotia; Marine Industries and Davie Shipbuilding, Quebec; and Victoria Machinery Depot, Burrard Shipbuilding, and Yarrows in British Columbia.

The boiler orders for the destroyer escort vessel programs also included the supply of valves which kept the machine shop busy for several years. These were Dewrance designed and included such items as five inch quick closing main steam stop valves of most demanding tolerances. They were a duplicate of equipment supplied by Yarrows of Glasgow for the first ship, approved by Admiralty but modified by Babcock-Wilcox & Goldie-McCulloch Limited to ASA standards. The ships were often referred to as "river class" vessels since they were all named after Canadian rivers, e.g. HMCS St. Laurent, Saguenay, Skeena, Fraser, Restigouche, Ottawa, and Margaree.

The destroyer escort orders firmly established Babcock-Wilcox & Goldie-McCulloch Limited in the marine boiler business, and between 1958 and 1971 forty more marine boilers were sold. These included propulsion boilers for Coast Guard Service, weatherships, icebreakers, RCN supply ships, and other types of vessels. The Navy business became important enough to the Company, that in July of 1959 the Company opened an office in Ottawa and hired retired Rear Admiral W. W. Porteous as its representative in that office. Admiral Porteous had been the Royal Canadian Navy's Chief of Naval Technical Services before his retirement.

A significant order was received in 1963 for the one and only boiler for SS Cape Breton Miner being constructed at Port Weller Dry Dock for Upper Lakes Shipping. This unit featured modified burners with Racer steam atomizers capable of a 10:1 turndown ratio and an automated boiler front for operation with reduced staff. The success of this dependable unit resulted in a repeat order a year later.

Department of Transport Weatherships CCGS Vancouver and Quadra were also equipped with Babcock-Wilcox & Goldie-McCulloch Limited boilers supplied in 1963 and 1964. These were 105,200 pounds of steam per hour units for ships built at Burrard Drydock in Vancouver.

In 1967 the Royal Canadian Navy placed another order with the Company, this time for four 107,000 pounds of steam per hour marine boilers to power supply ships HMCS Protecteur and Preserver. These vessels were constructed at the Saint John Shipbuilding & Drydock Co. in Saint John, New Brunswick.

The marine business started to decline in the mid 1960's with the advent of large diesel propulsion equipment and in 1970-1971 the firm supplied its last maritime boilers, three marine FM's.

However, during the era when steam boilers were a main source of marine propulsion, Babcock-Wilcox & Goldie-McCulloch Limited played a major role and, in fact, for several years obtained all of the domestic marine boiler business, according to a current employee who was at the time the salesman responsible for this market.

By 1961, the Company had entered into a joint venture agreement with Foundation Company and EIMCO and was advertising packaged sewage lift stations, and in the summer of 1962, the Company's Water and Sewage division supplied EIMCO equipment for the Galt Sewage Treatment Plant which was doubling its capacity. Although this was only one of several municipal projects, including the 1961 contract to supply six giant pumps for the Greater Vancouver Sewage and Drainage district treatment plant, this division was eventually closed down. The Company's license only allowed it to undertake municipal sewage contracts, which alone generated insufficient business to be economically feasible.

In 1961, the Company acquired the stoker business previously conducted by Affiliated Engineering Equipment, Ltd. and the right to manufacture, sell, and service Taylor, Perfect Spred, and Vibragrate stokers in Canada. In the same year, the Company entered into an exclusive agreement with the Layne & Bowler Pump Company of Los Angeles to manufacture and sell Layne & Bowler's pumps for oil refineries, irrigation, deep wells, condenser circulation, and other applications.

In 1962, the Company scored two major successes with the sale of two recovery boilers to MacMillan Bloedel, one for its newsprint mill in Harmac, B.C. and another for its Alpulp division in Port Alberni, B.C. The Harmac unit, rated at 2,400,000 pounds of black liquor solids per day, was at that time the largest recovery boiler in Canada. The Company also had quite a bit of success during the early and mid sixties with FM package boilers. However, we suspect that none were more interesting than two units sold for installation in Inuvik, in the North West Territories. These units, which are among the Company's northernmost installations, were transported across the ice by tractor train and installed on stilts set down into the permafrost.

The Benefit Society, having outlived its usefulness was disbanded in 1963 after 80 years of service. Expanded government social services had made the Benefit Society a redundant anachronism.

J. M. (Don) Douglas joined the firm in 1963 as Assistant to the President, Mort Robertson. His background was in mining engineering. For the first year he worked closely with J. S. E. MacAllister, familiarizing himself with the Company and its methods. Mr. Douglas remembers that he was allowed by the management to try any of his own ideas "provided he was right". He recalls that the Canadian company at that time was an aggressive, tightly, and cleverly run operation, making its own decisions. The parent company left Mr. Robertson pretty much to pursue his policies. It was a relatively small firm, doing some fifteen million dollars worth of business a year. All correspondence was read personally by the President (Mr. Robertson) who also signed all drawings. But the times were changing, and it was obvious that with the Company's expanding business volume, it could not continue to operate in this manner for much longer.

The year 1963 was also a milestone in that on July 24, 1963 the American company bought out the Goldie and McCulloch interests in Babcock-Wilcox & Goldie-McCulloch Limited leaving the American company with 58% ownership and the British company with 42%. After 104 years, the Goldie and McCulloch families had finally relinquished all ownership in the firm.

The year 1964 marked a major success for the United Steel Workers of America (USWA) at Babcock-Wilcox & Goldie-McCulloch Limited. On February 25, 1964, in a vote supervised by the Ontario Labor Relations Board, the USWA replaced the Canadian Steel Workers Union (NCCL) as the bargaining agent for the Company's shop employees by a vote of 211 to 190 after a five month organizing effort. The USWA had failed in a similar effort in 1943.

In 1964, the US Company acquired C. C. Moore and Company. Moore was engaged in a sales and service business for pulp and paper, petroleum, and other industries. The Vancouver operations and most of the contract backlog of C. C. Moore and Company were assigned by the US Company to Babcock-Wilcox & Goldie-McCulloch Limited and were absorbed into Babcock-Wilcox & Goldie-McCulloch Limited Vancouver operations.

Nineteen hundred and sixty-four was a big year for boiler sales in Canada (three times bigger than any previous year) but the Company's performance was mediocre. Of approximately $100M of orders placed, Babcock-Wilcox & Goldie-McCulloch Limited received about 30% of that amount, Combustion Engineering 58%, and the remainder was split among Foster Wheeler and others. The big losses to Combustion Engineering consisted of four units at Lambton ($36M), six recovery boilers ($7.3M), and three power boilers for pulp and paper companies ($2.1M). Combustion Engineering also took two 150MW units for Hydro Quebec ($7.5M) on a negotiated basis because of provincial preference. Babcock-Wilcox & Goldie-McCulloch Limited did, however, in that year win the order from Ontario Hydro for two 300MW Lakeview units ($11.5M) and for the two 150MW cyclone units at Nova Scotia Power Corporation's Glace Bay project. The Company also sold three recovery boilers, seven power boilers, and eight marine boilers in this record year for Canadian sales.

The shock of the loss of the Lambton units to Combustion Engineering caused the Company to undertake a major reassessment of its approach to Ontario Hydro and to institute a recovery program. Hydro did not place any more orders for thermal plants until 1967, but when it did, the order for four 500MW units for its Nanticoke Station went to Babcock-Wilcox & Goldie-McCulloch Limited. The Nanticoke project eventually grew to eight units and Babcock-Wilcox & Goldie-McCulloch Limited received the order for all eight boilers. At the time this is written (1987), Nanticoke, at 4000MW, is believed to be the largest coal fired power station in the non-Communist world.

During the period between the Lambton orders (fall of 1964 for units 3 and 4) and the Nanticoke orders, the Company also sold utility boilers to the New Brunswick Electric Power Commission (1x100MW, 1965), the New Zealand Ministry of Works (2x120MW, 1965), Nova Scotia Power Corporation (1x150MW, 1966 and 2x100MW, 1966), the City of Edmonton (2x165MW, 1966), and Manitoba Hydro (1x125MW, 1967).

With regard to nuclear operations, 1964 was a year in which the Company gave serious consideration to combining forces with Montreal Locomotive Works (MLW) to pursue the nuclear heat exchanger (steam generator) market. MLW had expertise in the heat exchanger field and MLW was expected to be the beneficiary of provincial preference in the upcoming bids for Hydro Quebec's Gentilly I nuclear plant. Babcock-Wilcox & Goldie-McCulloch Limited eventually decided to proceed on its own without MLW, and in 1964 the Company won the Gentilly order, followed by orders in 1965 and 1966 for the 48 steam generators at Ontario Hydro's Pickering A Generating Station and an order in 1966 from AECL for the six steam generators at the Kanupp 1 plant in Karachi, Pakistan. These orders clearly positioned Babcock-Wilcox & Goldie-McCulloch Limited as the company to beat in this field, and it developed that the Company won the orders for every one of the 207 CANDU steam generators subsequently ordered with the sole exception of the order for four steam generators for the Wolsung 1 unit in Korea which went to Foster Wheeler.

The President's report to the Board of Directors gave the following epitaph for the Steamblock boiler product line in March of 1967:

> *The Steamblock business is being wound up as quickly as we can economically dispose of stock — but sales of a quarter of a million dollars in the year, with write-offs showed a loss of $110,000. 1967 should see the burial of that enterprise.*

That same report complained about the low profitability on FM boilers.

A number of changes were made to the Company's physical plant during the period 1964 - 1967. The South Works office building, which was something of a Company landmark and which had been vacant since 1955, was demolished in the spring of 1965. It was determined that the building, which was over 100 years old, was not economically repairable and insurance and other considerations militated in favor of razing it. Prior to its demolition, the building was surveyed by the Galt city fathers as a possible city hall, but the idea was later abandoned.

The old steam plant at the North Works was also demolished in 1965, but in this case the reason was to make way for a 500 foot long extension to the original North Works building. This extension was occupied and largely in production by October of 1965, and became what is currently the boiler shop.

In 1966, the Company purchased a 273 acre property in Port Colborne, Ontario for future expansion. The site had access to the Welland Canal and was thought to be a good location for the fabrication of heavy nuclear vessels since it provided easy barge transportation. As it turned out, this site was never developed, and as of 1987 some small portions have been sold, but the bulk of it remains in the Company's possession.

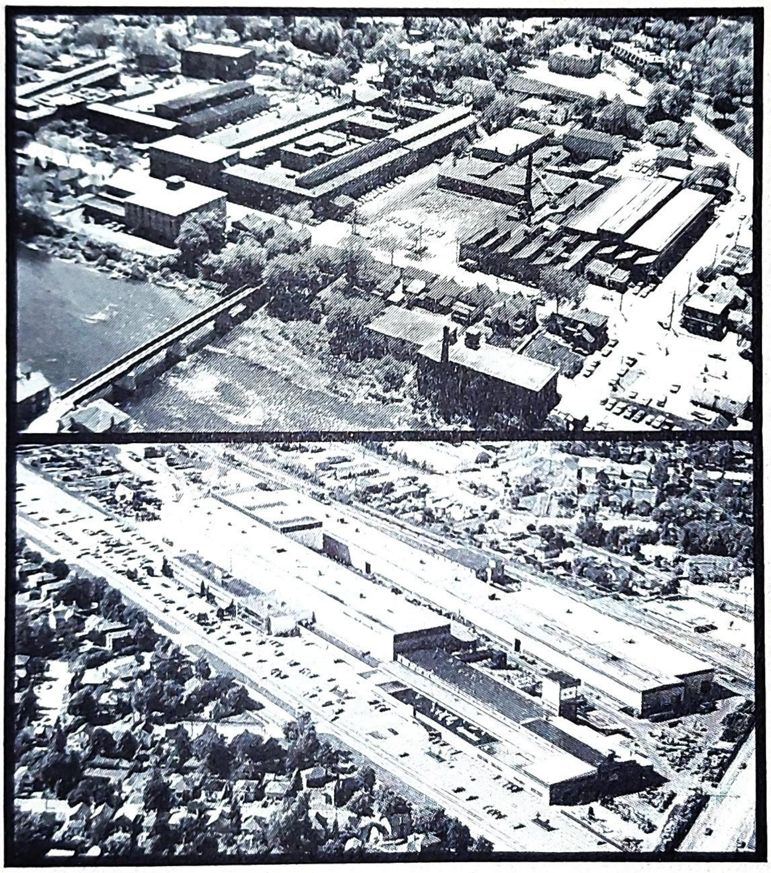
On the organizational front, there were two significant developments in early 1967. First, Mort Robertson retired as a president of the Company in March of that year and was made Chairman of the Board of Directors. He was succeeded as president by J. M. (Don) Douglas. On a later occasion, Mr. Douglas summed up Mr. Robertson's career with the Company as follows:

> *It is no exaggeration to say that the importance of Mr. Robertson's contribution to Babcock & Wilcox Canada Limited has been greater since the early war years than that of any other man... During his tenure of senior responsibility he directed the activities of the firm through a period of dramatic expansion and helped establish the Company as a leading Canadian manufacturer of steam generating equipment and pumps for domestic and export customers.*

J. S. E. MacAllister, Vice President-Sales, retired from the Company in May, 1967 with 31½ years of service.

The second organizational change of 1967 was the change of the Company's name from Babcock-Wilcox & Goldie-McCulloch Limited to Babcock & Wilcox Canada Ltd. The change gave the Company a less unwieldy name and it also more accurately reflected the Company's ownership since the Goldie and McCulloch interests had been bought out in 1963. Nonetheless, it marked the end of an era. The selling of the Goldie and McCulloch interests in 1963, followed by the retirement of H. L. McCulloch as Chairman of the Board of directors in March 1966, and finally the name change in 1967 signalled the end of 108 years of stewardship of the Company by members of the Goldie and McCulloch families.

CHAPTER
7
1968-1977



Aerial views (Top) South Works (Bottom) North Works c. 1975

BABCOCK & WILCOX CANADA LTD.

OVERVIEW OF PERIOD

The Company's operations during the period 1968-1977 were set against a backdrop of interesting and turbulent events in Canada and on the world stage.

	CANADA	WORLD
1968	Pierre Elliot Trudeau becomes Prime Minister Oil Tanker Manhattan navigates the Northwest Passage	Martin Luther King and Robert Kennedy assassinated
1969	Computer Centre of Sir George Williams University destroyed by student demonstrators	Neil Armstrong walks on the moon on July 20
1970	Canada announces conversion to metric system James Cross and Pierre Laporte kidnapped by FLQ terrorists	National Guard kills four student demonstrators at Kent State University
1971	William Davis becomes Premier of Ontario Prime Minister Trudeau marries Margaret Sinclair	Red China joins the United Nations Vietnam War continues — William Calle gets life for Mylai massacre
1972	Expelled Ugandan's allowed to enter Canada Team Canada wins Canada-USSR hockey tournament in final game in Moscow	Massacre of Israeli athletes at summer olympics in Munich, Germany Bobby Fisher beats Boris Spassky at chess in Iceland
1973	Canadian Yacht Greenpeace III seized by French while protesting Nuclear test Dr. Henry Morgentaler acquitted in Montreal of performing illegal abortions	War between Egypt, Syria, and Israel Vietnam War ceasefire signed First energy crisis with oil embargo causing gas lineups and soaring inflation

CANADA	WORLD
1974	
Canada's coastal jurisdiction extended to 200 miles Quebec's "Official Language Act" makes French the language of the province	Watergate scandal climaxes. Richard Nixon forced to resign as U.S. President Patty Hearst kidnapped by Symbionese Liberation Army
1975	
Government begins screening new investments via Foreign Investment Review Act (FIRA). Wage and price controls invoked (via AIB) to combat inflation	New York City goes broke Vietnam war ends dramatically as Viet Cong takes Saigon
1976	
The 21st summer Olympics are staged in Montreal Parti Quebequois under Rene Levesque wins power in Quebec	Israeli commandos strike at Entebbe Viking space craft lands on Mars
1977	
Via Rail created to operate Canada's passenger rail service Highway signs in Canada converted to metric Canadian dollar drops below .90 US	Anwar Sadat goes to Israel to talk peace Elvis Presley dies at 42 Jumbo jets collide on ground in Canary Islands, 581 killed

In the world these were watershed years as stability gave way to the great oil shocks, the dominance of the Vietnam War on the world stage, and the gathering clouds of inflation.

In Canada these ten years were also a traumatic period, marking the transition from the euphoria of Expo 67 when everything seemed possible to a period of uncertainty characterized by high inflation, deficits spending, and political turmoil as Quebec began to ponder separation.

Babcock & Wilcox Canada Ltd. was directly influenced by some of the major trends in the Canadian economy. One of the most important of these was a very high rate of growth in electric power consumption. A 1969 report noted that there were only 15 utilities in Canada, and their annual growth rates varied between 7%-14%. This made utility planning easy. Large stations could be ordered with confidence. If they weren't needed immediately, they would be needed soon. Another consequence was the emergence of the very large central station to provide base loading for the system. It was during these years that Nanticoke (4000MW) and Lambton (2000MW) were ordered.

For the company this was a mixed blessing. One single order could provide work for years. A single order could provide 50% or more of a year's bookings, but if it were not secured the shop loading was subject to violent swings.

The oil shocks triggered a major movement away from oil as a fuel, giving prominence to coal and even more to nuclear power. As a consequence, by 1970 Babcock & Wilcox Canada Ltd. embarked on a strategic program to establish itself as a major Canadian nuclear hardware supplier. As an outgrowth of this Babcock & Wilcox Canada Ltd. planned a major nuclear steam fabrication facility at Port Colborne. By 1974 a plan had been developed. It called for Babcock & Wilcox Canada Ltd. to "plan, execute and commence operation of a Nuclear Steam Generator Assembly Facility at Port Colborne by 1st quarter 1976". Sanity and a mild recession in 1974 and 1975 prevailed, and by February 1976 it was decided that:

> *We will not proceed with expansion of the nuclear line into additional major components requiring expertise which is not in-house and additional facilities during the currency of this five year plan.*

In other words, the Port Colborne shop was dead, although brief efforts to revive it persisted for some years.

The utility trend to larger coal fired stations also meant larger individual units. Until the late 1960's, a 200MW unit was considered a large utility boiler. By 1971 Babcock & Wilcox Canada Ltd. had completed its first 500MW unit for Nanticoke, at a 16% overrun on shop hours. The next unit was completed well within estimate.

There were several other major trends of interest during these years. National unity became an issue as Quebec became increasingly nationalistic and sales from Ontario into that province became extraordinarily difficult.

Inflation increased steadily during this era, culminating eventually in the Anti Inflation Board (AIB). Babcock & Wilcox Canada Ltd. felt that the AIB regulations would restrict profit margins, and decrease capital availability for expansion. This view had merit in an era when Babcock & Wilcox Canada Ltd.'s goal was to achieve a 16% return of operating income to operating investment.

An event that was to have enormous consequences occurred about 1970 when the Canadian dollar was freed to float in the open market. Until that time, it had been rigidly pegged to the American dollar. This free float eventually allowed the present (summer 1987) 75 cent dollar which is a major factor aiding Babcock & Wilcox Canada Ltd. competitive position. Another development that year (1970) was the barter deal by the government of Saskatchewan of wheat for Japanese power turbines. While the Canadian Wheat Board banned future deals of this kind, Saskatchewan just recently signed a deal whereby Japanese power turbines were bought with a commitment not to barter, but to countertrade for the value of the goods.

At the start of the seventies, Babcock & Wilcox Canada Ltd. worried considerably that 80% of its production was related to a single product, fossil boilers. The Company wanted to diversify. The best options were heavy construction, nuclear scope expansion, and western oil and gas participation. Developments were very slow, because in 1977 fossil boilers were still over 80% of the Company's annual shop load. This situation was not reversed until the early 1980's.

The impact of the various trends can be shown by looking at Babcock & Wilcox Canada Ltd. three different perspectives: ventures and new directions, competition, and exporting.

To build profitability Babcock & Wilcox Canada Ltd. entertained a number of ventures and new directions. Leaving aside its expansion into nuclear steam generators, Babcock & Wilcox Canada Ltd. decided to "establish a new Gas and Oil Division in Alberta not later than 1974 to supply manufacturing and repair facilities to the existing industry and to the present and future oil sands plants". This project percolated along for some years but in 1976 it was recognized that while

> *...solid growth in oil and gas industries continues to promise opportunities to Babcock & Wilcox Canada Ltd. for products in which we have existing expertise...no plans have been laid to take advantage of this opportunity until 1979.*

Expansion into the oil and gas industry was dead.

Babcock & Wilcox Canada Ltd. for many years ran a successful pump business, but faced an increasing field of competitors, especially in the U.S.A. By the early 1970's the viability of the business was in doubt. There were major studies done in 1971 and 1973 but no firm decision to exit the business came until 1976.

> *The pump business is being discontinued by not accepting orders for new pumps or replacement parts. Negotiations have been concluded with respect to the disposition of assets related to the pump business.*

In 1977 Babcock & Wilcox Canada Ltd. restructured the organization along functional lines. The Company began defining charters and assigning accountability in line with responsibility. Along with this would be pin-pointing of specific responsibility for front end control (proposal management) and back end control (project management).

During this decade Babcock & Wilcox Canada Ltd. also became aware of the potential of the service business. Service finally received prominence in 1977.

> *Some customers are reacting to our unreliable delivery history by locating alternate sources of supply for spare parts. This market erosion is being attacked by improvements in the Service Parts Sales organization, monitoring programs, and in order processing. These changes are designed to improve customer/company inter-*

> *face, to surface problem areas for more rapid resolution, to decrease "residence time, and to reduce lead times to facilitate improved delivery performance and hence our ability to secure this lucrative business."*

On the competitive front Babcock & Wilcox Canada Ltd. faced Combustion Engineering and Foster Wheeler as key competitors in 1968. Combustion Engineering competed only on large industrial and utility projects, and Foster Wheeler on boilers to 800,000 pounds of steam per hour. Ten years later this situation had not substantially changed. Even in 1987 the situation remains much the same.

Furthermore, from about 1972 on, it was recognized that Combustion Engineering and Foster Wheeler planned to enter the nuclear field. By 1977 Babcock & Wilcox Canada Ltd. reluctantly recognized that Foster Wheeler had become a credible competitor, and indeed Foster Wheeler was successful in winning the AECL export contract to Wolsung in Korea. Combustion Engineering never did enter the steam generator market per se, but entered the nuclear fuel market, an area in which Babcock & Wilcox Canada Ltd. did not compete.

Competitors aside, the early 1970's were good years. Babcock & Wilcox Canada Ltd. noted that:

> *...pricing policy on utility boilers is to price as close to 16% markup overall to selling price as possible. When possible, higher markups will be sought. Some export work in this line may of necessity be priced somewhat lower at 13.5% to 14% markup as conditions warrant.*

The years 1968 to 1977 set the stage for Babcock & Wilcox Canada Ltd.'s current export success. In 1968 exporting was an afterthought. By 1977 it was a major part of the business.

In 1968 Babcock & Wilcox Canada Ltd. recognized foreign market orders only as those market projects which the division actually tendered. The full extent of the potential export market was unknown. In 1971 the prevailing attitude was "foreign markets are served...to a very limited extent, and only when profit inducement is attractive and manufacturing and engineering capacity available." The goal at this time was to obtain about 8% of the Company's fossil bookings from export markets.

Those who feel that competition from the Japanese is a relatively new phenomenon will find the following quote from the President's March, 1968 report to the Board instructive:

> *We are gradually increasing our knowledge of the export markets and have acquired a number of energetic agents in South America, New Zealand and Australia.*
>
> *Price competition from the Japanese in particular is very severe and more favorable financing terms from overseas are becoming a severe handicap in this field.*

By 1973 Babcock & Wilcox Canada Ltd. finally noted that there must be constant pressure in the export marketplace so that customers would know the Company was serious in its intent to meet their needs. Marginal pricing of key jobs to fill otherwise idle capacity became viewed as an effective policy. Also in 1973, exports had risen to 10% of total shipments. One year later exports were still at 10% of shipments but now made up 45% of the years total bookings.

In 1976 Babcock & Wilcox Canada Ltd. recognized that the "export markets continue to be of significance with 18.2% of total shipments and 48% of total bookings...to non-Canadian customers."

By 1977 there was a new maturity to the export program. A separate International Business Strategic Program was established to promote this business and documents of that year expressed for the first time some export realities.

> *The international marketplace offers an excellent opportunity to compensate for the reduced domestic demand. Our success in this market will depend on our ability to meet the special marketing demands of extended scope of supply, possible consortium and partnership participation, and improved market coverage.*

In 1987 we couldn't have said it better.

COMPANY OPERATIONS

This decade 1968-1977 was a time of tremendous growth in business volume for Babcock & Wilcox Canada Ltd. In 1968, the Company's revenues were $24.8M and by 1977 they had grown to $138.7M. These revenues were distributed as follows:

	1968	**1977**
Fossil boilers and accessories	13.3	69.3
Nuclear	0	19.3
Service and parts	3.4	22.1
Pumps	1.1	3.6
Misc. products	4.4	.7
Erection	2.6	23.8
	24.8	**138.8**

This phenomenal growth occurred in virtually all segments of the Company's business, but it was driven particularly by the sale of the large fossil and nuclear central stations such as Nanticoke (1967 and 1970), Eshkol

(1969 and 1972), Hadera (1974), Pickering (1965, 1966, and 1974), and Bruce (1970 and 1975).

On January 10, 1968, the *Kitchener-Waterloo Record* published an article on "Canada's leading manufacturer of steam-generating equipment." The article began as follows:

> *Of the leading business places which have grown up with this city, none has brought it more fame than Babcock & Wilcox Canada Ltd., formerly Babcock-Wilcox & Goldie-McCulloch.*
> *For a century now, the wheels of Canadian industry have literally turned on machinery made in this company's Galt plants.*
> *From the sawmills of Vancouver Island to the shipyards of Halifax, there isn't an industrial community in Canada where you won't find the name of this company stamped in steel.*
> *...Babcock & Wilcox Canada Ltd. is inundated with contracts to supply sophisticated boiler systems to nuclear and thermal power plants on almost every continent in the Western orbit.*

As these statements would indicate, the company was doing well and was proceeding steadily on a major order for Ontario Hydro's Nanticoke Generating Station.

In that same year (1968), the company acquired the condenser pump business of Westinghouse Electric Corporation of Pittsburgh, Pennsylvania. This move allowed the company to manufacture and sell a full line of condenser circulating and extracting pumps in North America. Babcock & Wilcox Canada Ltd. also acquired the manufacturing and selling rights for nuclear and standard pumps developed by Etablissements Pompes Guinard of St. Cloud, France. In a third such move that year, Babcock & Wilcox Canada Ltd. acquired the sales and manufacturing rights, through a licensing agreement, for shell and tube heat exchangers and fin tube, air cooled heat exchangers from Yuba Industries of Tulsa, Oklahoma.

The pump division entered the U.S. market and by spring 1969 had such contracts as eleven pumps sold to Babcock and Wilcox Company for a Youngstown Sheet & Tube steel mill installation to Indiana; three condenser pumps for Oklahoma Public Service Company; eight condenser pumps for Consolidated Edison Co., Indian Point Station in New York; and four condenser pumps sold for Gulf States Utilities Company, Beaumont, Texas.

At the close of 1968, the company landed a major utility order for Saskatchewan Power Corporation — a $1.8 million deal to supply one 100MW B&W Radiant boiler for the Queen Elizabeth Station in Saskatoon. The oil and gas fired boiler would produce steam at a rate of 850,000 pounds of steam per hour, and would be commissioned in June 1971.

In 1969, the company was awarded a major contract for Ontario's East Hamilton Solid Waste Reduction Unit, designed to produce steam by burning garbage from the Hamilton area. This contract included boiler, controls, precipitators, stacks, refuse feed system and auxiliary equipment.

Nineteen hundred and sixty-nine was also a busy year in nuclear work as the company proceeded with 48 steam generators for Ontario Hydro's Pickering A station, due to go on line beginning in 1970.

Babcock & Wilcox Canada Ltd. began 1970 with a major utility contract for Nova Scotia Light & Power Co. Limited, a $2.3 million order to supply a B&W Radiant boiler for the Tufts Cove Generating Station near Dartmouth. This oil-fired boiler, to be completed in early 1972, would produce superheated steam at a rate of 700,000 pounds of steam per hour, at a temperature of 1,010°F with reheat. The boiler would have an operating pressure of 1,850 psig and a design pressure of 2,150 psi.

That year the company introduced a controlled odor technique for recovery boilers to the pulp and paper industry. In a nine month period, Babcock & Wilcox Canada Ltd. received four orders from the industry, the only four orders placed during that period in Canada.

These orders covered a controlled odor black liquor chemical and heat recovery boiler for Cariboo Pulp & Paper Company, Quesnel, B.C.; one to British Columbia Forest Products Limited for their new MacKenzie Pulp and Paper Division pulp mill at MacKenzie, B.C.; one to Ontario & Minnesota Pulp and Paper Co. Ltd., Fort Francis, Ontario; and one for Kamloops Pulp and Paper Co. Ltd., Kamloops, B.C. The unique design of these units was the elimination of any contact between odor-bearing black liquor and cool stack gases so that odors could not be transferred to the atmosphere. Black liquor was burned efficiently in a relatively high temperature furnace where most odor-forming constituents were destroyed. The technology simplified maintenance, reduced operating expense, and required less building space.

Also in 1970, Atomic Energy of Canada Limited placed a $3 million order with Babcock & Wilcox Canada Ltd. for three PFT boilers for its Bruce Heavy Water Plant at Douglas Point, Ontario. These boilers, with a total capacity of 2,505,000 pounds of steam per hour, would operate at 650 psi and would supply steam for the production of heavy water to be used in CANDU nuclear power reactors.

In December 1970, the company newsletter published an article highlighting the extensive work the company was performing for Ontario Hydro and Atomic Energy of Canada. Part of that article read as follows:

> *A long list of contracts for the production of radiant boilers, steam drums, steam generators, preheaters, a variety of pumps, one package boiler and erection for Ontario Hydro at Nanticoke and both Hydro and Atomic Energy of Canada Limited at Bruce, are all in various stages of development at B&W.*
>
> *These major orders, which will take almost six years to complete, provide our shops with an excellent base work load through 1977. The B&W Nanticoke orders for Hydro: eight 500 megawatt radiant*

boilers, six low pressure service water pumps, eight high pressure service water pumps, four coal pile drain pumps and one FM package boiler.

Bruce Nuclear Power Development for Hydro: 32 heat exchangers, eight steam drums, 16 preheaters, eight B&W moderator pumps and 12 large vertical condenser pumps, all for Bruce Nuclear G.S.

Bruce Nuclear Power Development for A.E.C.L.: three PFT boilers for the Bruce Heavy Water Plant; eight steam generators, two steam drums and four preheaters for the Auxiliary Steam Plant and two HG pumps for Douglas Point G.S.

Babcock & Wilcox Canada Ltd. scored a major international victory in 1970 and began what would become a long relationship with the Israel Electric Corporation Limited. In a Canadian government financed deal worth $15 million, Babcock & Wilcox Canada Ltd. would receive $10 million for two boilers for the 420MW Eshkol power project at Ashdid, south of Haifa, Israel.

In a signing ceremony on Parliament Hill, industry and trade minister Jean-Luc Pepin stated:

> *This is quite a significant piece of business for Canada and I congratulate the exporters involved. A power plant will be an excellent example of Canadian technology and engineering in this market. I think it is significant too, that Canadians won the order in international competition.*

Exports continued in 1971 with the sale of five boilers to three African countries. Three were sold to the Republic of Botswana to generate power for a nickel-power production complex. A large PFI boiler was sold to Pan African Paper Mills, Broderick, Kenya; and an FM package boiler was sold to Ropes & Matting, a rope, mat and padding plant at Durban, South Africa.

Babcock & Wilcox Canada Ltd. added a fifth controlled odor recovery boiler to its list in 1971 with a sale to Miramichi Timber Resources Limited, Newcastle, New Brunswick. By this time the Power Generation Group in Barberton, Ohio, had sold thirteen such units in the U.S. The advanced technology was catching on.

Canadian utility sales continued in 1972 with the February signing of a $14 million contract with the New Brunswick Electric Power Commission. Two radiant boilers would be installed in a new power generating station at Lorneville, near Saint John. Each boiler would supply 2,158,100 pounds of steam per hour at 2875 psi with superheat and reheat temperatures of 1005°F, burning crude oil or bunker "C" oil. These new units, each producing 300MW, would be the largest installed in the Maritime provinces and each would have twice the capacity of the largest units in the Saint John area at that time.

Success also continued in 1972 in recovery boilers and equipment for the pulp and paper industry. For British Columbia Forest Products

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> *Bruce Nuclear Power Development for Hydro: 32 heat exchangers, eight steam drums, 16 preheaters, eight B&W moderator pumps and 12 large vertical condenser pumps, all for Bruce Nuclear G.S.*
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Success also continued in 1972 in recovery boilers and equipment for the pulp and paper industry. For British Columbia Forest Products at MacKenzie, Babcock & Wilcox Canada Ltd. installed Swedish-designed multiple-effect evaporators, the first of their kind in North America. These evaporators, for which Babcock and Wilcox had exclusive North American manufacturing rights, work in conjunction with a controlled-odor recovery boiler to help eliminate odor from pulp mills.

In October, Babcock & Wilcox Canada Ltd. shared with its U.S. parent in a $1.5 million order placed by the first paper mill in Kenya. Canada would supply a PFI boiler rated at 200,000 pounds of steam per hour, and Babcock and Wilcox Company in the U.S. would supply a 225 ton Kraft recovery boiler. The new mill would be operated by Pan African Paper Mills Ltd., 400 miles south of Nairobi.

Also in 1972, the second of six 300 ton, 100 foot long steam drums was delivered to the Nanticoke site.

Nineteen hundred and seventy-three would prove to be a very successful year for sales, both domestic and international. In Canada, Babcock & Wilcox Canada Ltd. landed utility projects in three provinces.

Nova Scotia Power Corporation placed an order for an additional 150MW unit for its Tuft's Cove Generating Station.

New Brunswick Electric Power Commission ordered a third large boiler for its new Coleson Cove Generating Station in Saint John. This boiler, added to the two previously ordered, would bring the station's total capacity to 1,000MW.

The City of Edmonton in Alberta ordered two 165MW boilers for the Clover Bar Generating Station, to be added to two boilers previously ordered from Babcock & Wilcox Canada Ltd. Firing natural gas, each of these radiant reheat boilers would produce 1,100,000 pounds of steam per hour at 1,800 psi and 1,000°F. This latest contract brought the total of large boilers sold by Babcock & Wilcox Canada Ltd. to the City of Edmonton to fourteen.

It was also a busy year in 1973 for the package boiler business at Babcock & Wilcox Canada Ltd. In the first ten months of the year, Babcock & Wilcox Canada Ltd. booked thirty-two orders for package boilers — twenty-seven destined for Canada and five to be exported to four countries overseas. These small boilers, worth a total of $5.5 million, would be installed in oil refineries, textile plants, paper mills, a hospital, the mining and smelting industry, breweries and a number of general manufacturing industries. Total combined output from these boilers was 2,790,300 pounds of steam per hour, more than each of the large utility boilers at the Lakeview generating station in Ontario.

On the international front in 1973, Babcock & Wilcox Canada Ltd. was awarded a contract to supply two large boilers to the Comision Federal de Electricidad of Mexico. Two 300MW radiant oil-fired boilers would be installed at the Tula Thermal Electric Power Station near Mexico City. These units were unique in that they were outdoor units, with only the control rooms being in an enclosed building.

But bigger news was continued success with the Israel Electric Corporation. Babcock & Wilcox Canada Ltd. received an $11.5 million contract for two 228MW oil-fired radiant boilers for the Eshkol Generating Station at Ashod, near Tel Aviv. This brought Babcock & Wilcox Canada Ltd.'s total contracts for Israel to four units totalling 876MW of generating capacity. The success with Israel would continue in the future.

Babcock & Wilcox Canada Ltd. also landed another recovery boiler order in Canada, this one a $2.5 million contract to supply a chemical recovery boiler to British Columbia Forest Products Limited at Crofton on Vancouver Island.

On January 7, 1974, J.M. Douglas, President of Babcock & Wilcox Canada Ltd., outlined the upcoming year to the local newspaper. In that outline Douglas said: "While we are generally optimistic, our company will face some problems in the coming year." He predicted problems with production and employment. For production, his concern was tightening of supply and lengthening of delivery of needed materials. On the employment side, his concern was finding a sufficient number of skilled tradesmen to meet production commitments. The company would, indeed, have employment problems in 1974.

Babcock & Wilcox Canada Ltd.'s first order for South East Asia came in 1974 when P.T. International Nickel Indonesia ordered two large industrial boilers. These oil-fired boilers would be installed at a new nickel ore mine and extraction plant on the island of Sulawesi, east of Borneo, and would produce steam for electric power generation.

On the nuclear front, the fourth unit at Pickering A was going on line. At the same time, J.M. Douglas was elected president of the Canadian Nuclear Association. The election was held in Montreal during the organization's 14th Annual International Conference.

In accepting the nomination, Douglas stated:

> *As a manufacturer I am concerned that the CNA encourage a strong nuclear manufacturing industry in Canada. My company [Babcock & Wilcox Canada Ltd.] like many other manufacturers has allocated machinery and expansion of shop facilities to produce components for the CANDU system. In doing this, we are demonstrating our faith in the system and in AECL's ability to continue to successfully market our Canadian nuclear power system.*

But in the midst of all this activity, trouble was brewing in Babcock & Wilcox Canada Ltd. On May 28, the company announced the formation of a negotiating team to represent the company in negotiations with the United Steelworkers of America local 2859. The current labour agreement with the local which represented 875 production and maintenance workers was to end August 31.

The average hourly rate in the shop was $4.44, with a base rate of $3.45 and a top hourly rate of $5.15. The company also paid the full cost of the employees' benefits package which included hospital, medical, drugs, weekly indemnity, and life insurance. Employee pension benefits were also fully paid by the company.

On September 4, after rejecting a $1.35 average wage increase for a new two-year contract, the union called a strike. The main issue was the cost of living. Mediator H.R. Illing, Ontario Ministry of Labour, Toronto, was called in.

As the strike entered its second month, the company began a local awareness campaign, broadcasting that it was offering an additional $5,300 per average employee in wages in its latest proposals. This figure did not include benefits and cost of living payments. Holding the $1.35 figure constant, the company was offering a cost of living proposal with a 25 cent per hour limit which would give quarterly five-cent increases beginning January 1, 1976. With 616 of the 890 eligible steelworkers voting, the offer was rejected by 93%.

In early November, confrontations between striking and non-striking workers erupted and arrests began. Strikers were trying to prevent non-union employees from entering the plant. Five people were arrested in one Friday demonstration. After 74 days, a settlement was reached and the strike ended. Workers would receive an average wage increase of $1.35 — 75 cents immediately and 60 cents on October 1, 1975, raising the shop average wage to $5.19. The 21.5 month agreement also provided for cost-of-living payments of 10 cents per hour on April 1, 1975 and a further 10 cents on January 1, 1976. Shift premiums were raised from 21 to 40 cents, weekly indemnity raised from $90 to $110, and life insurance raised from $6,000 to $7,000. Also, workers received an additional floating holiday, five weeks vacation at 20 rather than 23 years, and six weeks vacation at 30 years of service.

Labour disruptions nothwithstanding, the Company continued to have major successes in the international markets. The announcement was made from corporate headquarters in February 1974. Babcock & Wilcox Canada Ltd. had just booked the largest single export contract in its history — a landmark job to supply four 350MW coal and oil-fired radiant boilers to the Israel Electric Corporation. This was the third major order that the utility had placed with Babcock & Wilcox Canada Ltd. in the past five years.

The new order was for the upcoming MD Generating Station (Hadera) to be located near Caesarea between Haifa and Tel Aviv. Each unit would supply 2,556,000 pounds of steam per hour at 2050 psi with superheat and reheat temperatures of 1005°F.

The four units were to go on-line one year at a time beginning in 1978, with final unit commissioning in 1981.

This order helped push Babcock & Wilcox Canada Ltd. ahead of Combustion Engineering in Canada. For a ten year period, Combustion Engineering Canada led Babcock & Wilcox Canada Ltd. in total bookings with

$284.3 million, a $15.1 million edge. But taking the years 1969 to 1974, Babcock & Wilcox Canada Ltd. gained the lead with total bookings of $173.9 compared with Combustion Engineering's $128.2 million.

Babcock & Wilcox Canada Ltd. also led in employment in early 1974; 640 salaried and 840 hourly compared with Combustion Engineering's 475 salaried and 400 hourly. Babcock & Wilcox Canada Ltd.'s shops were much larger (and still are), and a *B&W Canada New's* article on these comparisons included the following:

> *Statistically Babcock & Wilcox Canada Ltd. leads Combustion in almost everything but profits. Babcock & Wilcox Canada Ltd.'s total annual shipments are about 50 percent higher and the company's growth rate and Canadian content are greater. The two companies are about even in the market share of large fossil fired boilers but Combustion Engineering shows a higher return on investment.*

Factors influencing Combustion Engineering's edge in profitability were Combustion Engineering's concentration on large fossil-fired boilers with more profit; gaining some advantage from Quebec's purchasing policy favoring local manufacturers; and fabricating in a Sherbrooke, Quebec location offering lower wage scales.

But the strike took its toll financially, on the company. Although the 1974 volume of shipments was the largest in the company's history, the 11-week strike seriously eroded 1974 earnings. Shipments in 1974 were $62,204,000, up from $60,664,000 in 1973. But the company sustained a loss, its first in nearly 30 years, of $448,000 compared with 1973 earnings of $1,307,000. The strike was listed as the main factor, although other factors were rising material costs, difficulty in obtaining skilled manufacturing personnel, high interest rates, and general inflation.

Nineteen hundred and seventy-five was a light year on the Canadian fossil utility side with the only major order being for Saskatchewan Power Corporation — a $20 million deal to supply a 300MW coal-fired radiant boiler for the new Poplar River station south of Regina. This boiler would go on line in 1978.

But internationally, Babcock & Wilcox Canada Ltd. landed a major contract in June to supply two coal-fired utility boilers to Thailand. This contract, also valued at $20 million, was financed by the Asian Development Bank.

Back in Canada, Babcock & Wilcox Canada Ltd. became involved in the Alberta tar sands development with an order for five large boilers for Syncrude Canada Ltd. Three of the boilers would produce steam for electrical power generation. The other two would provide process steam for the entire plant, once in operation. Each boiler was rated at 750,000 pounds of steam per hour at 950 psi firing natural gas and refinery gas. When fully operational, Syncrude would extract 125,000 barrels of oil a day from the oil-rich tar sands of Alberta.

Nuclear activity also increased in 1975. The New Brunswick Electric Power Commission placed a $5 million order for four nuclear steam generators to be installed at the new 600MW Point Lepreau station near Saint John on the Bay of Fundy. The combined capacity of these four steam generators, similar to those ordered for Hydro Quebec's Gentilly II station, would be approximately 8,000,000 pounds of steam per hour at 681 psi.

That same year Ontario Hydro placed an order for 48 nuclear steam generators for its new Pickering B station east of Toronto. The Pickering A station was by now fully operational, with 48 Babcock & Wilcox Canada Ltd. nuclear steam generators in four units, producing 2,160MW of power. So in 1975 Babcock & Wilcox Canada Ltd. was busy with nuclear work adding this Pickering B contract to 32 steam generators and steam drums and preheaters for the 3,000MW Bruce station, and four steam generators for the 600MW Gentilly II station.

In another "first" for Babcock & Wilcox Canada Ltd., Lummus Company Canada Ltd., on behalf of Ontario Hydro, placed a large order with the Construction Department. Babcock & Wilcox Canada Ltd. would supply and erect eight towers for the Bruce Nuclear Power Development's third heavy water plant on Lake Huron, near Port Elgin. The project was valued at $24 million. These towers were listed as the largest pressure vessels ever attempted in modular form. The six first-stage towers would stand 301 feet tall with a 28 foot internal diameter. The two second-stage towers would stand above 260 feet with 24.6 foot internal diameters.

In early 1976, the one hundredth heat exchanger fabricated at Babcock & Wilcox Canada Ltd. was shipped, with great fanfare. This particular unit was destined for the Bruce A nuclear station.

With a backlog of 111 to follow, the list of 100 read as follows:

6	Steam generators for Pakistan
1	Steam generator for the AECL Nuclear Power Demonstration plant in Rolphton
48	Steam generators for Pickering A
45	Steam generators for preheaters for Bruce A

But at the same time, Ontario Hydro was announcing a $5.2 billion cutback in its 10-year electrical expansion program, a cut that would be felt at Babcock & Wilcox Canada Ltd. through contract delays. Hydro would remain, however, the company's largest customer in Canada.

Construction work at the Bruce Heavy Water plant, and related work at the Company's Sarnia facility, was progressing, but future building at the Heavy Water plant was cancelled in light of Hydro's $5.2 billion reduction.

Babcock & Wilcox Canada Ltd. did manage to land another export order in 1976, however. In a deal exceeding $12 million, the company would provide a large black liquor recovery boiler to Polimex-Cekop in

Poland. This order was listed as a "significant breakthrough" into the Eastern European market. The 800-ton per day boiler would supply 442,000 pounds of steam per hour at 925 psi with a superheat temperature of 840°F.

The company began 1977 with a $6 million order to supply Fraser Companies with an MgO (Magnesium Oxide) recovery boiler for installation at Edmunston, New Brunswick. This would be the largest boiler of its type in the world with a continuous capacity of 368,400 pounds of steam per hour at 1250 psi, with a superheat temperature of 950°F. The unit would be capable of handling 2,200,000 pounds of red liquor solids per day.

Later in the year Babcock & Wilcox Canada Ltd. went export again with a $6 million contract to supply a large black liquor recovery boiler and a hogged wood and oil-fired power boiler to the Nigerian National Paper Manufacturing Company Limited. These units would be erected just south of Lagos, with delivery of components beginning in late 1977.

In Canada, the company ended 1977 with a $7.5 million utility order from Newfoundland & Labrador Hydro. Babcock & Wilcox Canada Ltd. would supply a 150MW oil-fired radiant boiler for the Holyrood Generating Station on the eastern shore of Conception Bay, 15 miles from Saint John. Commercial operation was scheduled for November 1979. This unit would produce 1,072,000 pounds of superheated steam per hour at 1900 psi and 1005°F.

Also in 1977, the last of four, 223-ton nuclear steam generators was shipped to the CANDU 600MW plant at Cordoba, Argentina. The first of four similar steam generators was shipped to the Gentilly II station in Quebec and two of the four units at the Bruce A station had reached full power.

Even with its major cutbacks announced, Ontario Hydro proceeded with plans to build a new 3,400MW nuclear station at Darlington. Babcock & Wilcox Canada Ltd. would receive the order for these steam generators in 1978.

COMPANY EXPANSION

The South Works in Galt remained busy in the late 60's, and the company newsletter commenting on the foundry in the South Works noted in 1968 that the foundry could "...pour a wider variety of metals than any other foundry in Canada."

While the foundry was very profitable *circa* 1970, it became less and less competitive. Company plans noted that:

> *...the market for custom castings is extremely soft with intense competition from other foundries who have been expending capital to modernize, and in some cases, specialize. Gross margins have*

> *been reduced to lowest acceptable levels to meet lower cost competitors.*

As early as 1976, the company recognized that "the present Foundry location cannot be continued much beyond 1980 due to environmental considerations." And so the foundry was discontinued.

Meanwhile, the North Works was embarking on a series of expansions that would greatly increase plant capacity and productivity. In July 1968, an IBM 360 was installed for accounts payable and receivable, plus payroll and material control.

In October 1969, the company announced a $650,000 expansion to the Tube Shop. This 30,000 square foot addition was to increase the tube facility by fifty percent. The addition included two large overhead cranes and specialized machinery needed for the manufacturer of boiler components.

Continuing the expansion in 1970, the company purchased four acres of land, formerly a gravel pit, on Jaffray Street to be used for storage of stock materials and completed components. This purchase brought Babcock & Wilcox Canada Ltd.'s total land holdings to 37 acres at the North Works and 50 acres of total holdings in Galt.

Also in 1970 the company announced plans to construct a $500,000 nuclear clean room for the fabrication of steam generating equipment for nuclear generating stations. This 20,000 square foot building more than doubled Babcock & Wilcox Canada Ltd.'s large nuclear component capacity, and created an additional 100 jobs in Galt. The interior would be pressurized to one eighth inch water gauge, and special equipment would include a 200-ton overhead crane to handle the large nuclear components.

On April 1, 1970, *Industry* magazine published an article that began as follows:

> *Galt's oldest and largest industry, Babcock & Wilcox Canada Ltd., Tuesday honored 52 employees who have served the company for a total of 1,730 years.*
>
> *At an inaugural dinner to found a new quarter-century club company officials paid tribute to all company employees with 25 years or more of service.*

The article continued:

> *Older members of the group discussed early days with the company when it only had a fraction of its present staff and when the boilers and pumps turned out were little more than miniatures of the giant equipment the plant produces today.*

Herbert H. Parkinson was easily the longest serving member of the new club. He began with Goldie & McCulloch Company Limited in 1915, left to serve in the Royal Flying Corps, and returned in 1919. He was officially retired at age 70 in 1967, but was kept on as a special consultant in pump sales and service.

Some interesting facts that came from the gathering were:

- *Three brother teams had totals of 68, 58 and 62 years of service.*
- *A brother-sister team had a total of 85 years.*
- *A cousin team had 75 total years.*

The Quarter Century Club continues as an active organization today, and holds an annual dinner-dance.

In 1971, office space was rented near the Hespeler Holiday Inn, primarily for the Marketing Department. This meant that the Marketing, Erection, Pump, and Package Boiler Departments were all remotely located from the head office.

The Clean Room was officially opened, on February 16, 1971 by Allan E. Reuter, MPP for Waterloo South.

On May 1, 1972, Babcock & Wilcox Canada Ltd. was made part of the newly-formed Power Generation Group of The Babcock and Wilcox Company. The Power Generation Group consisted of six divisions: Fossil Power Generation, Nuclear Power Generation, Industrial & Marine, Nuclear Equipment, The Babcock and Wilcox Construction Company, and Babcock & Wilcox Canada Ltd. The group headquarters were, and still are, in Barberton, Ohio.

With the exception of the manufacture of nuclear fuel, Babcock & Wilcox Canada Ltd. supplied most of the products and services offered by the other five Power Generation Group divisions.

In 1972, Babcock & Wilcox Canada Ltd. opened a facility in Sarnia, Ontario to provide specialized fabricating support for its expanding construction activities. Equipment at Sarnia included two ten-ton overhead cranes, a large remote stress relieving furnace and submerged arc welding equipment. The facility was designed to fabricate a wide range of equipment including condensers, heat exchangers, pressure vessels, tanks, evaporators, piping, parts for boiler repairs, steel stacks, and structural steel.

By 1972, Babcock & Wilcox Canada Ltd. was expanding its construction capabilities beyond boiler erection. Potential markets were turbine and generator, condenser and heavy machinery installation in power plants; and erection of piping, structural steel, tanks, precipitators, evaporators, dust collectors and pressure vessels of all types. On April 24, the company announced the opening of regional construction offices in Galt, Halifax, and Vancouver.

Babcock & Wilcox Canada Ltd. also opened a regional sales office in San Francisco in 1973 to market the company's pump division products.

In January of 1973, the former communities of Galt, Hespeler and Preston amalgamated to form Cambridge, Ontario.

In 1973, Babcock & Wilcox Canada Ltd. awarded a contract to a local construction firm valued at $450,000 to add 24,000 square feet to the south end of the main office building on Coronation Boulevard. Construction of the 80 x 100 foot section would be complete by March 1974, providing needed office space.

In the plant, the company installed a new horizontal plate roll capable of forming some of the heaviest steel rolled in Canada. This roll could form cylinders up to 14 feet in diameter with a maximum width of 12 feet, with steel thickness capacities of 4 inches cold and 8 inches hot.

Soon after the new office building was complete, Babcock & Wilcox Canada Ltd. announced plans for a 23,500 square foot expansion to its boiler shop facilities. This $600,000 94 by 250 foot expansion was needed to help accommodate larger steam drums and heavy components being fabricated for large utility and industrial boilers. Construction was stopped for three months in 1974, during the strike.

Earlier that year the company had begun a 60 by 200 foot tube bending facility on Jaffray Street.

On Saturday, June 1, 1974, Ontario's Energy Minister Darcy McKeough cut the ribbon to open Babcock & Wilcox Canada Ltd. offices and shops to the public. An Open House had been organized for local residents, and 3,000 interested people poured through all of the company's facilities in Cambridge. Tours were held at the North Works on Coronation Boulevard and shuttle buses linked the computer center on Sheldon Drive and the Package Boiler Assembly area in southern Galt. The last Open House had been held in 1969, before much of the company's expansion.

Between 1971 and 1976, the Company invested $10 million to expand shops and purchase new equipment. In 1976, the Company committed another $300,000 for a structure that would house nondestructive testing equipment used to examine welds in steam drums and large sections of fabricated steel plate. This structure, the Linatron Vault, was 100 feet long, 45 feet wide, and 45 feet high with a 12 by 54 foot projection on one side. This facility was the largest of its kind in Canada. To house the x-ray equipment, the reinforced concrete vault had walls from 4.5 to 5 feet thick, and an entrance door that weighed 240 tons. The main piece of equipment in the vault was a four million electron volt accelerator operated by remote controlled cranes.

On July 1, 1976, T.M. Campbell Jr. was named President and Chief Executive Officer of Babcock & Wilcox Canada Ltd., as J.M. Douglas moved to Chairman of the Board.

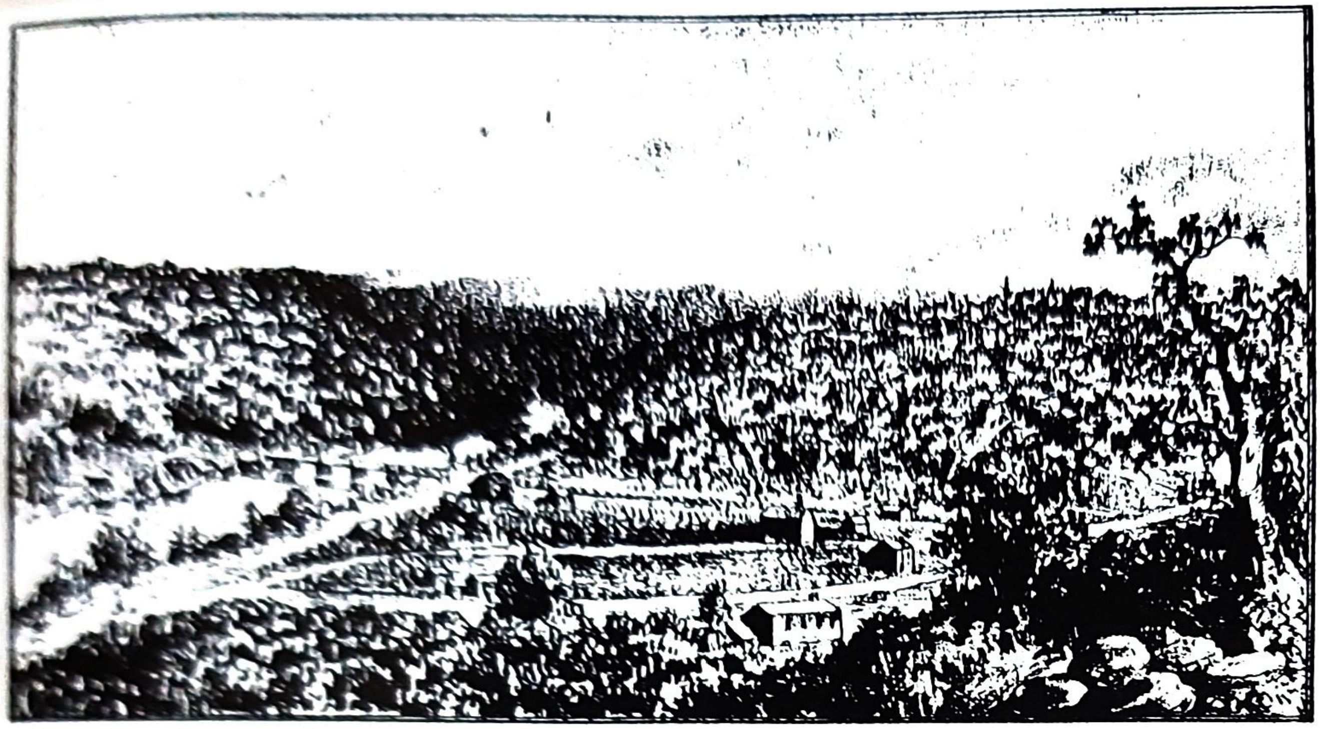
A fitting end to this dissertation on Babcock & Wilcox Canada Ltd. is found in a newspaper article that appeared in the *Kitchener-Waterloo Record* on January 10, 1968. The statement holds true today:

> *So inseparably have the fortunes of Galt's people been bound up with this historic firm that it would be pretty hard for anyone to imagine the city without Babcock & Wilcox.*
>
> *And the way business has been shaping up lately, it looks as though*

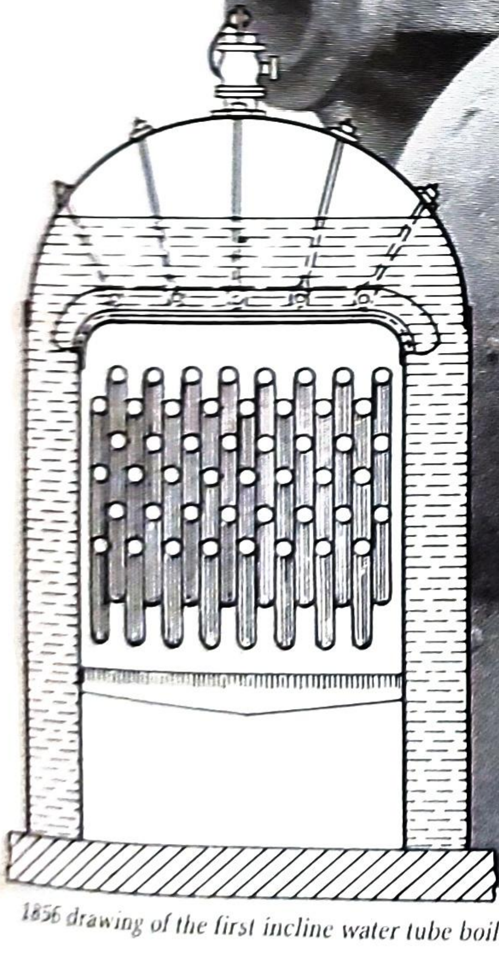
the company is going to be around at least for another century-and-a-quarter.

For several months in 1977, The Babcock and Wilcox Company of New York resisted a tender offer proposal by United Technologies Corp. (UT) of Hartford, Connecticut. UT withdrew its bid on August 25, 1977, clearing the way for J. Ray McDermott & Co., Inc. of New Orleans to combine with Babcock and Wilcox Company at a price of $62.50 per share. This was the big organizational news for the year, but had a spin-off effect in Canada. Extreme pro-Canadian forces were calling for the Foreign Investment Review Agency to block McDermott's purchase of Babcock & Wilcox Canada Ltd. They felt the company should be bought by Canadians but FIRA approved the McDermott takeover, and the U.S. Company's corporate headquarters were eventually shifted from New York to New Orleans.

In April of 1978, an event occurred that was to signal the beginning of a major upheaval in the Company's affairs. In that month, Ontario Hydro verbally notified the Company that some eddy current test probes had become stuck during routine inspection in a steam generator at the Pickering site. There followed a series of events that resulted in the cessation of all work on the Bruce and Pickering steam generators in December, 1978. The subsequent Nuclear Steam Generator Recovery Program was possibly the most severe test to which the Company was ever put, and the execution of that program, which is a saga unto itself, dominated the next five to six years of the Company's history. However, the present history will end at December 31, 1977, since the current chronicler wearies at the mere thought of recounting that epoch tale.



Rough sketch of Shade's Mill (Galt) 1820.



1856 drawing of the first incline water tube boiler.

(James Ainslie & Co., Printers, Galt.)

ARTICLES OF AGREEMENT, made and enter

August in the year of our Lord one thousand eight hundred and fifty

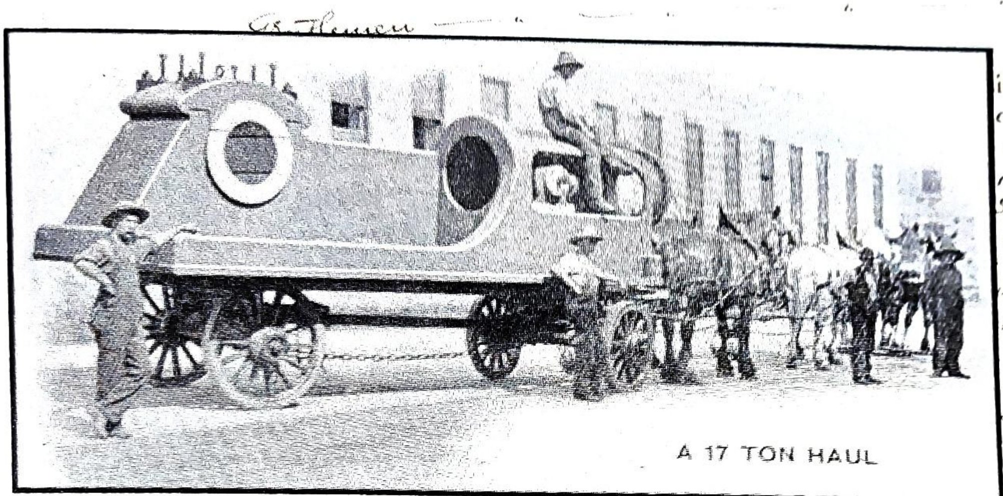
James Crombie of the Town of Galt in the County

Esquire

of the first part, and

John Goldie and Hugh McCulloch both of the town

Gentlemen


A 17 TON HAUL

idoration of the Covenants

— now Town — of Galt

Block A. lying on

and which said

Street — Thence along

Thence South twenty

or less to West Main

parcel of land situate

perches be the same

said West side of the

North eighty seven degrees

to the South West Corner

five minutes West

AND the said party of the second part, in consideration of the premises, doth here

hundred and eighty dollars with interest

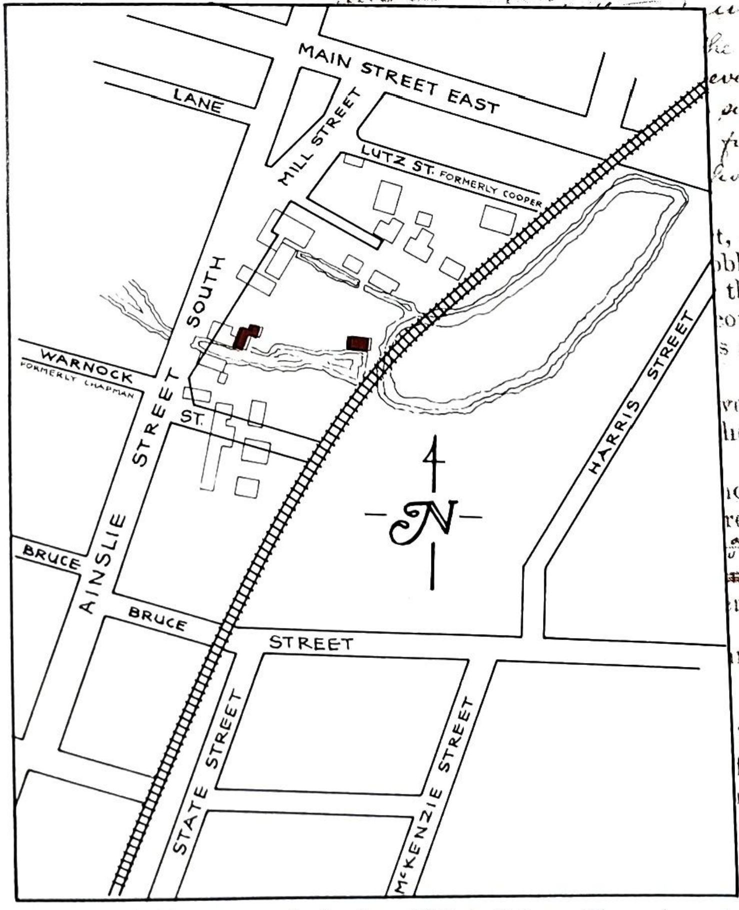
the first day of January which will be in the year

seventy-three; the sum of three thousand and forty

sum on the first day of January one thousand

first day of January in each and every year

thousand and eight hundred and sixty. — ..



1986 Cambridge streets indicating 1851 buildings. The coloured shows the possible location of the original Dumfries Foundry. c. 1844.

t, on receiving the said sum of Eleven thousand

obligatory, made by the said party of the second part

that he the said party of the first part, shall and will

conveying and assuring to them, the said party of the

s a Bar of any Dower in the said premises, that may be

veen the parties to these presents, that the party of the

he agreements hereinafter contained.

he second part, shall pay all taxes and assessments

red and fifty-nine and shall continue to pay the

at the expiration of the policy or policies now in force

become due on account thereof —

~~annual interest accruing thereon, shall be unpaid and in~~

r, without the consent of the party of the first part,

nderstood that time shall be of the essence of this Con

in fulfilling this agreement, or any part thereof, on the

forfeited and annulled, and if the said party of the se

he party of the second part, and remove him therefrom

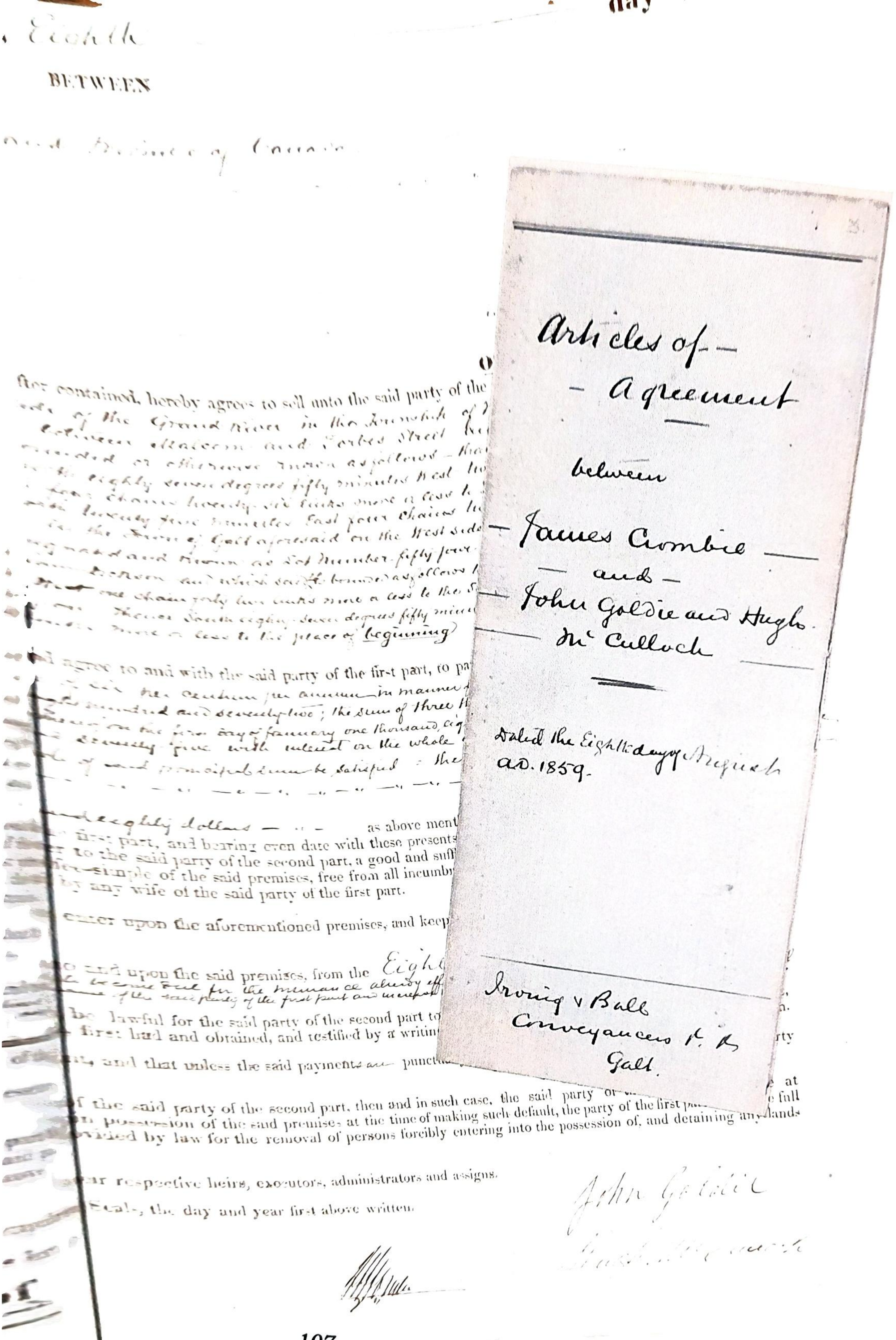
en the said parties that the above stipulations shall

F, the said parties to these presents have hereunto set

Signed and Sealed in the Presence of

(The clause concerning insurance being first interlined and the words "if at any time the annual interest accruing thereon shall be unpaid and in arrear" erased.)

J. H. Ball



Eighth

BETWEEN

and Province of Canada

fter contained, hereby agrees to sell unto the said party of the

of the Grand River in the Township of

between Malcolm and Forbes Street

bounded or otherwise known as follows – thence

North eighty seven degrees fifty minutes West

four chains twenty six links more or less to

and twenty five minutes East four chains

in the Town of Galt aforesaid on the West side

designated and known as Lot Number fifty four

Dickson and which said lot is bounded as follows

thence one chain forty two links more or less to the

Thence South eighty seven degrees fifty minutes

more or less to the place of beginning

agree to and with the said party of the first part, to pay

six per centum per annum in manner

hundred and seventy two; the sum of Three H

on the first day of January one thousand, eig

seventy five with interest on the whole

of said principal sum be satisfied – the

eighty dollars – as above ment

first part, and bearing even date with these presents

to the said party of the second part, a good and suff

fee-simple of the said premises, free from all incumbr

by any wife of the said party of the first part.

enter upon the aforementioned premises, and keep

and upon the said premises, from the Eigh

to become due for the insurance already eff

of the said party of the first part and interest

be lawful for the said party of the second part to

first had and obtained, and testified by a writin

and that unless the said payments are punctu

at

the said party of the second part, then and in such case, the said party of the first part full

possession of the said premises at the time of making such default, the party of the first part any lands

provided by law for the removal of persons forcibly entering into the possession of, and detaining

their respective heirs, executors, administrators and assigns.

Seals, the day and year first above written.

John Goldie

Articles of –

– Agreement

between

James Crombie

and

John Goldie and Hugh McCulloch

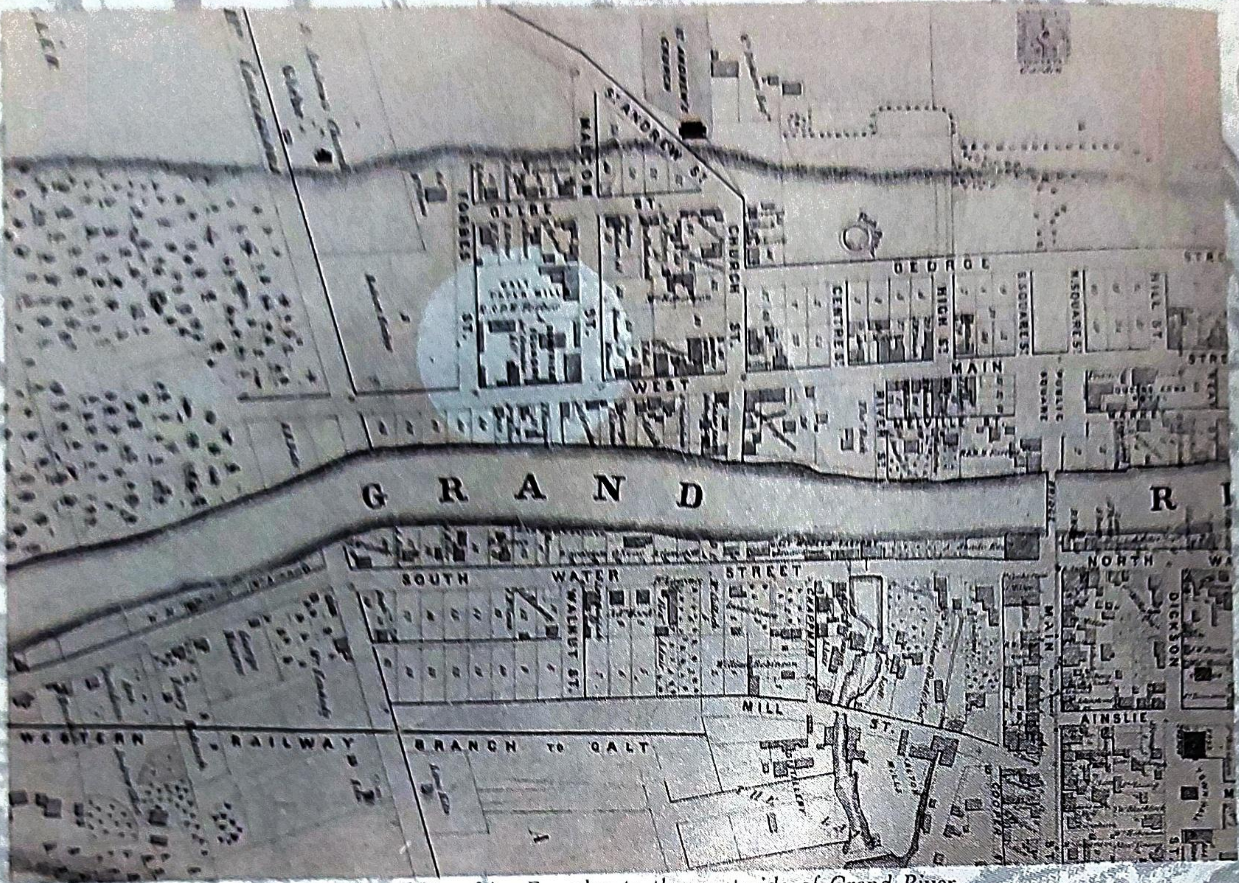
Dated the Eighth day of August A.D. 1859.

Irving & Ball

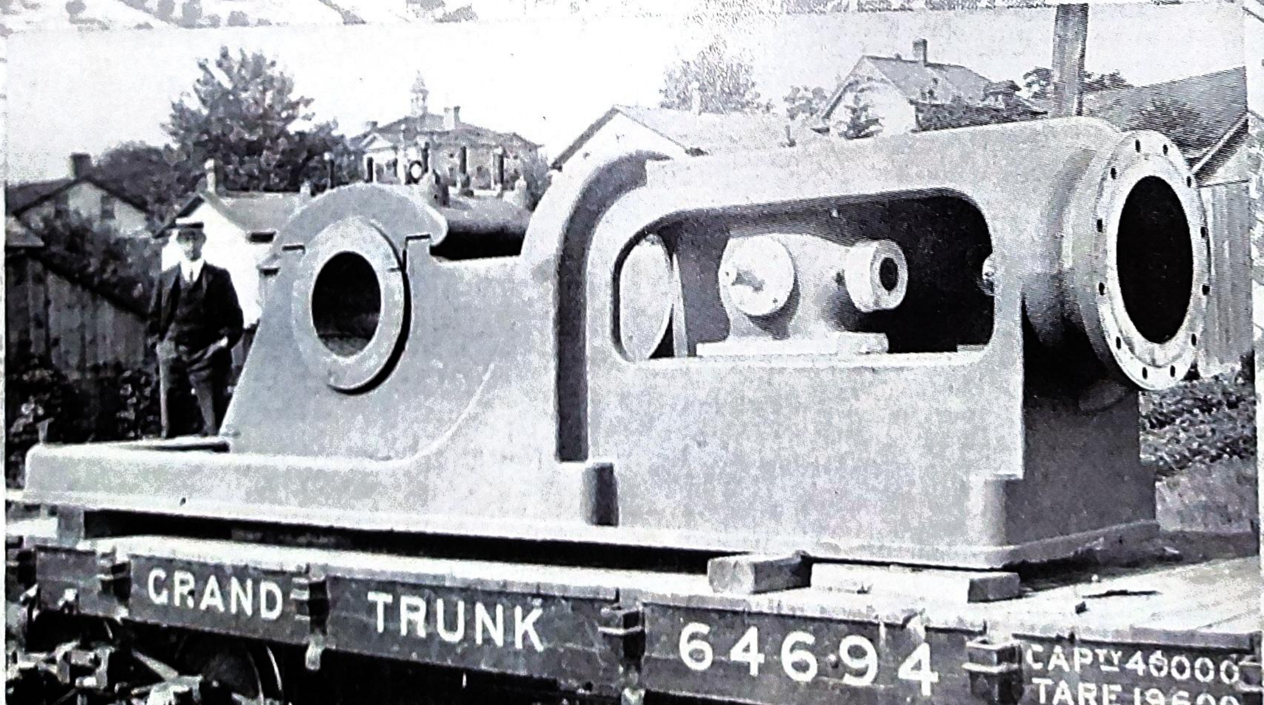
Conveyancers &c &c

Galt.

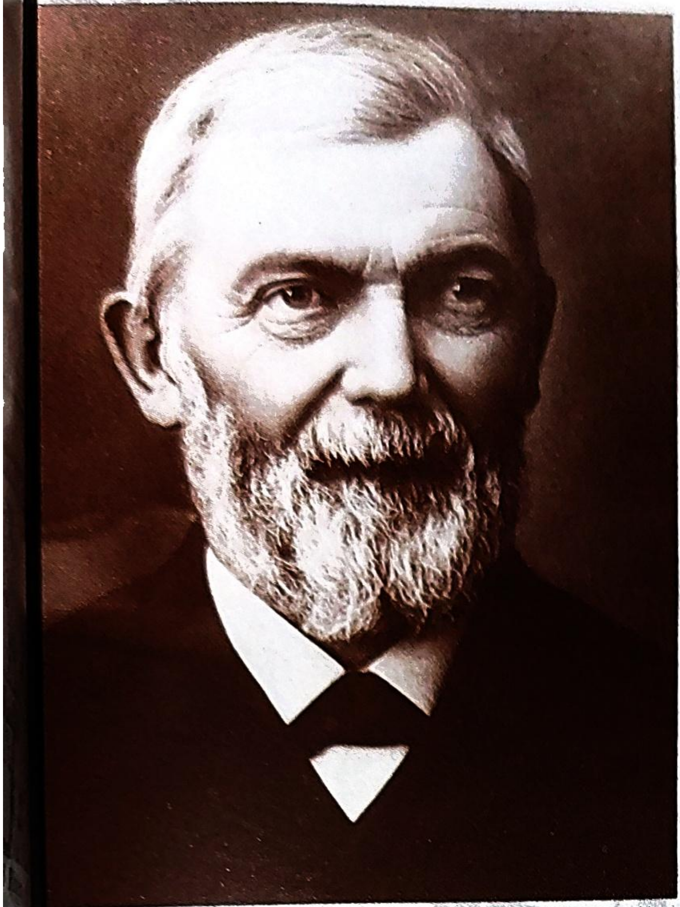
1859 Articles of Agreement for the sale of Dumfries Foundry to John Goldie and Hugh McCulloch, August 8, 1859.



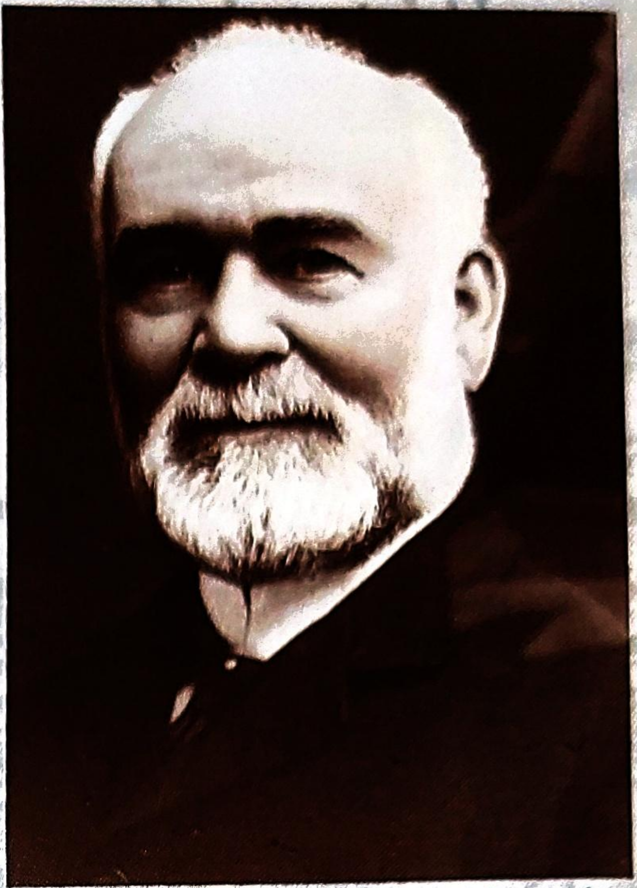
1851 map indicating the relocation of Dumfries Foundry to the west side of Grand River.



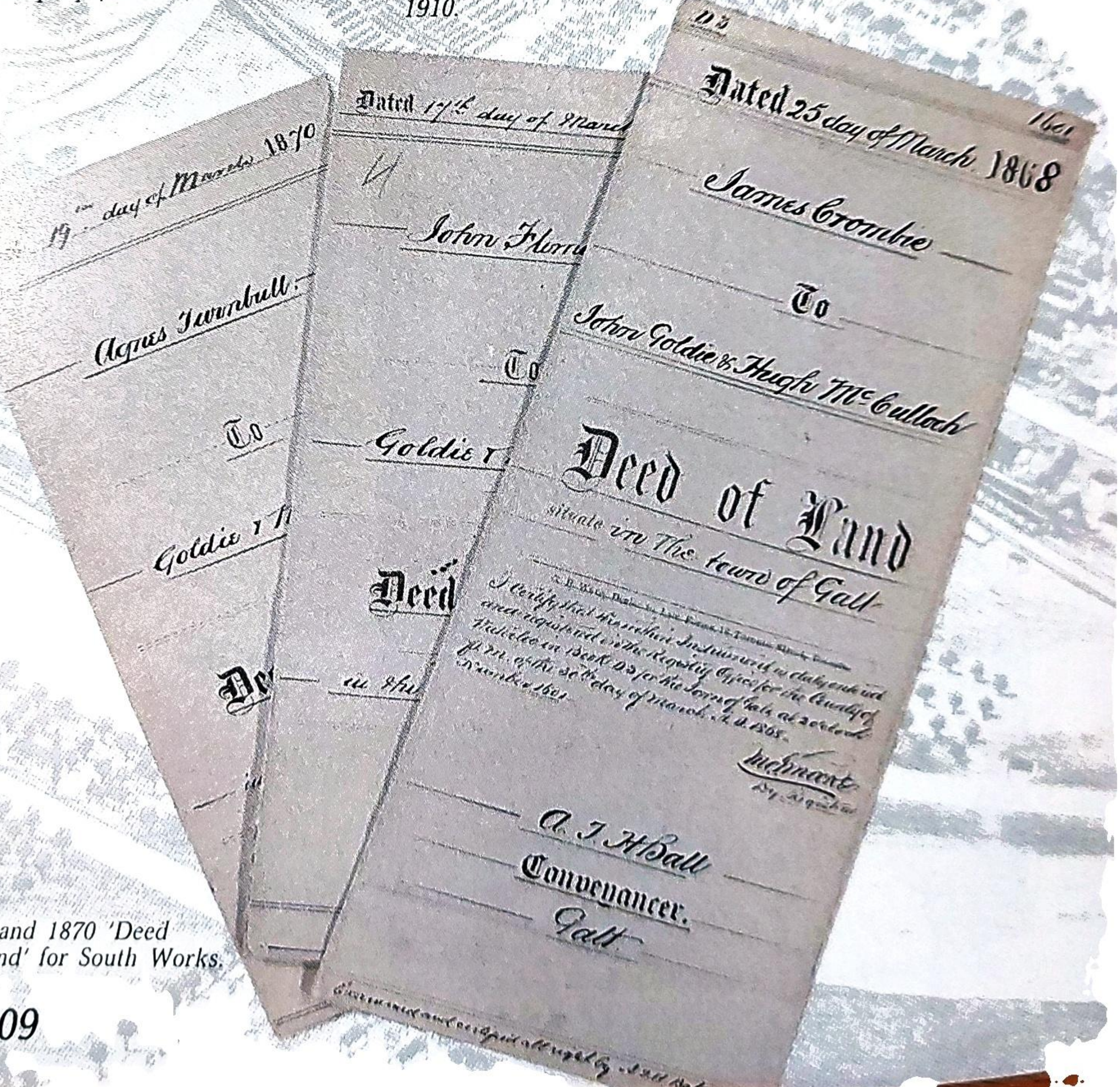
Frame of a Heavy-Duty Engine built by Goldie & McCulloch Co. Limited c. 1900



John Goldie, (1822-1896) General Partner in the Goldie McCulloch & Co. 1859 - 1891 and Manager of The Goldie & McCulloch Company (Limited) 1891 - 1896.



Hugh McCulloch, Sr. (1826-1910) General Partner of the Goldie McCulloch & Co. 1859 - 1891, and President of The Goldie & McCulloch Company (Limited) 1891 - 1910.



Dated 25 day of March 1868

James Crombie

To

John Goldie & Hugh McCulloch

Deed of Land

situate in The town of Galt

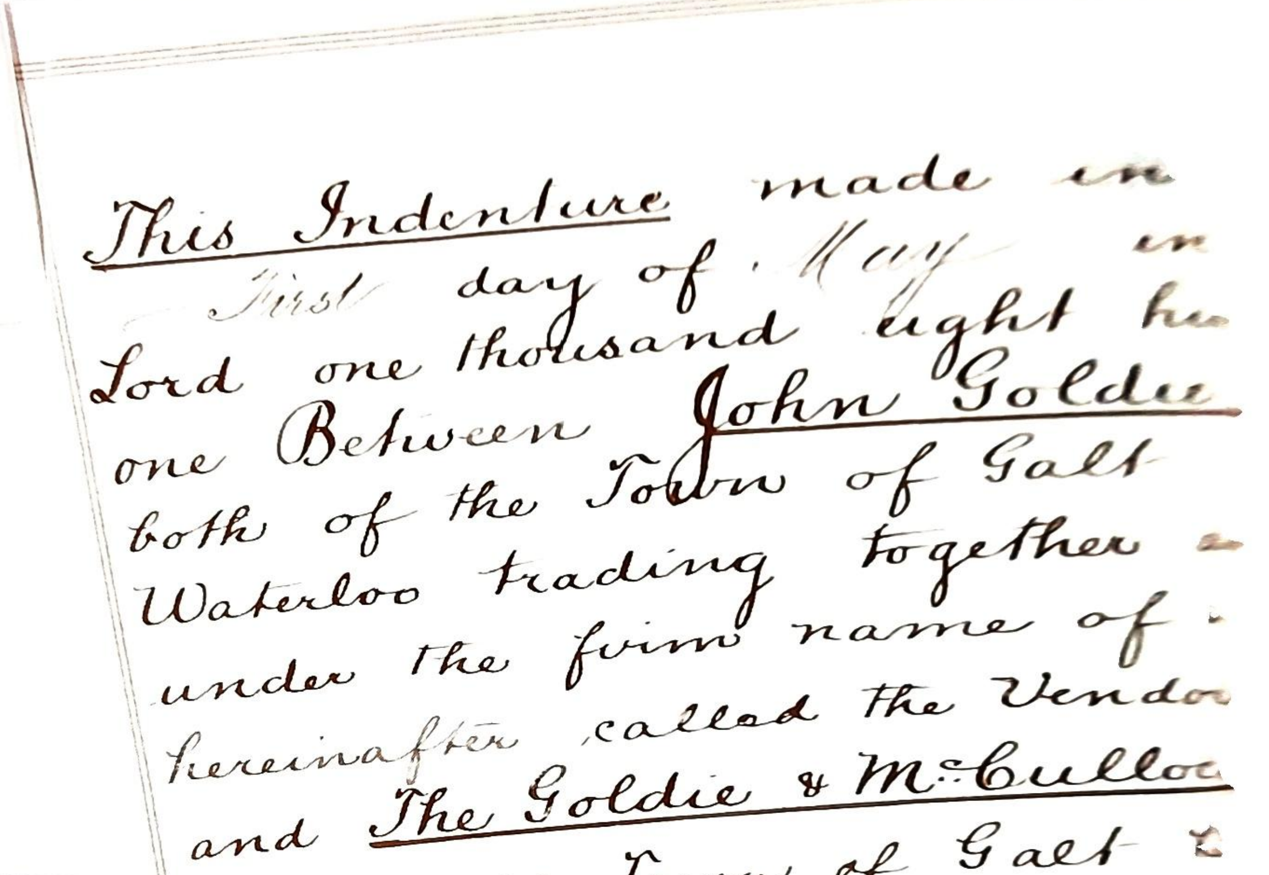
A. J. H. Ball

Conveyancer.

Galt

1868 and 1870 'Deed of Land' for South Works.

Incorporation documents of
The Goldie & McCulloch Company Limited (1891)



This Indenture made in
First day of May in
Lord one thousand eight hu
one Between John Goldie
both of the Town of Galt
Waterloo trading together a
under the firm name of
hereinafter called the Vendor
and The Goldie & McCulloc
Town of Galt
of the second pa
the said Vendors
on the trade
ers, manufacturers
d Town of Galt
is at the present
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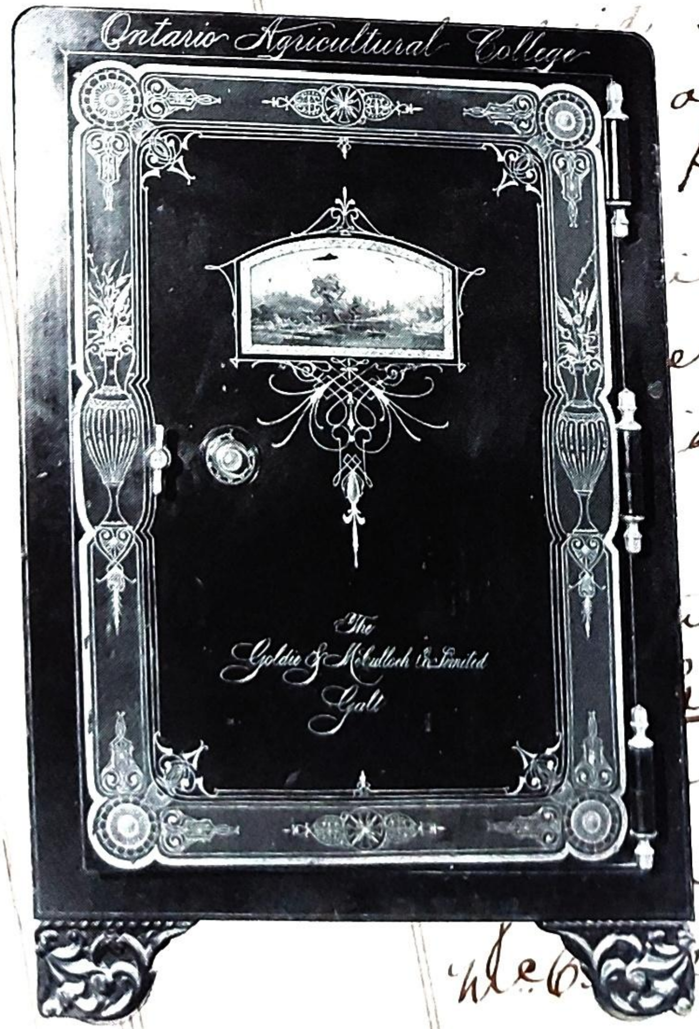
accountant and
of Toronto
the City


Ontario Agricultural College
The Goldie & McCulloch Co. Limited
Galt

This safe, manufactured for the Ontario Agricultural College, is believed to have been built in the mid-188[illegible]. It is typical of safes manufactured by the Company at this period. Note the decorative hand painted [illegible] the scenic painting.

...d and ninety
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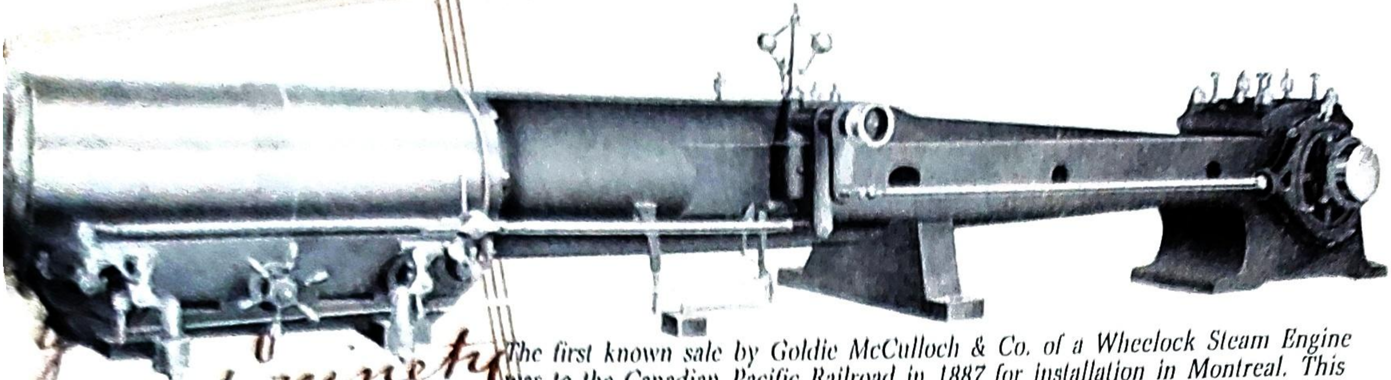
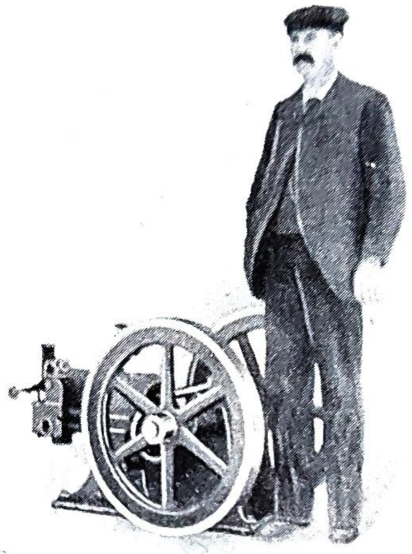
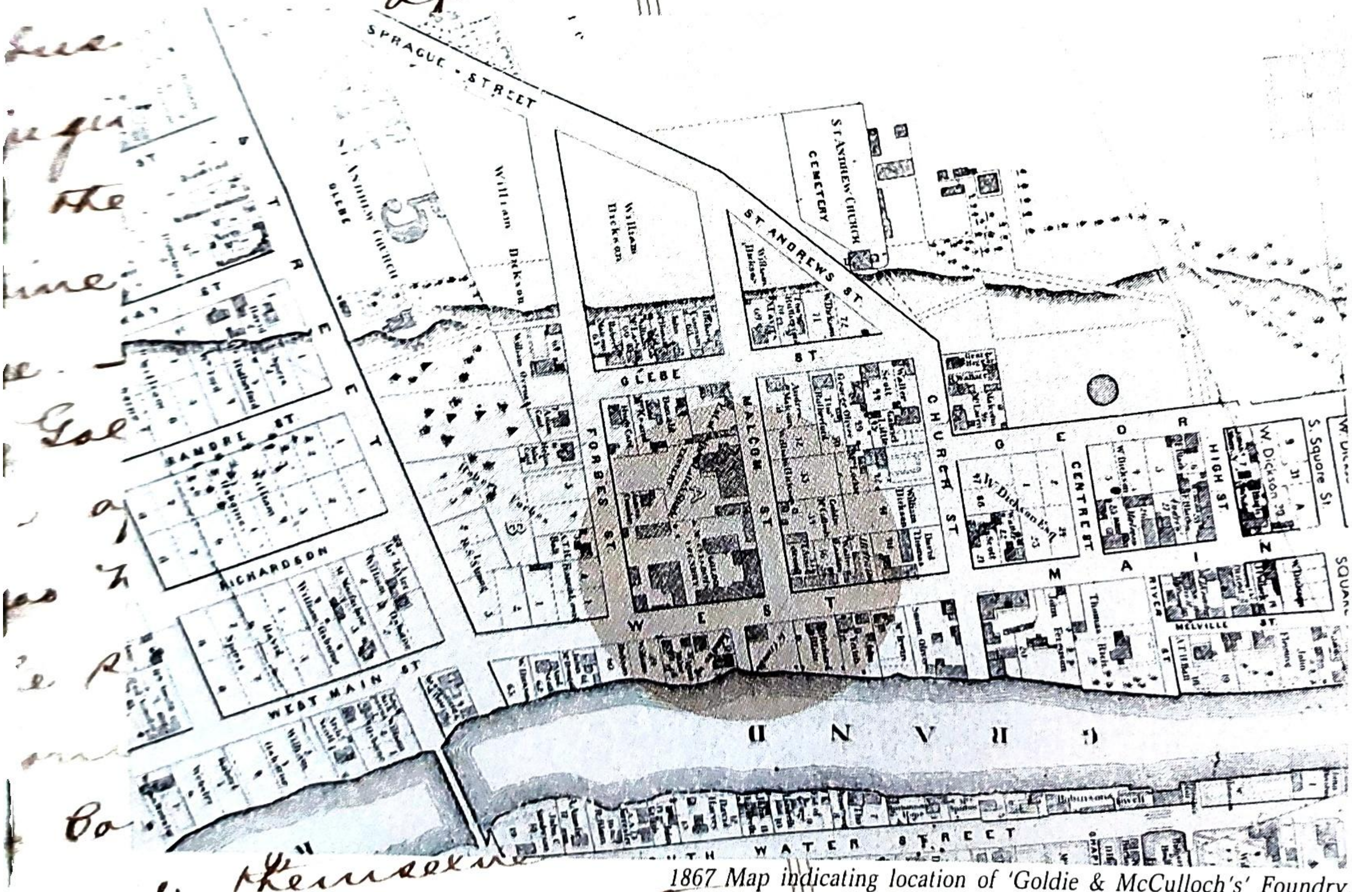


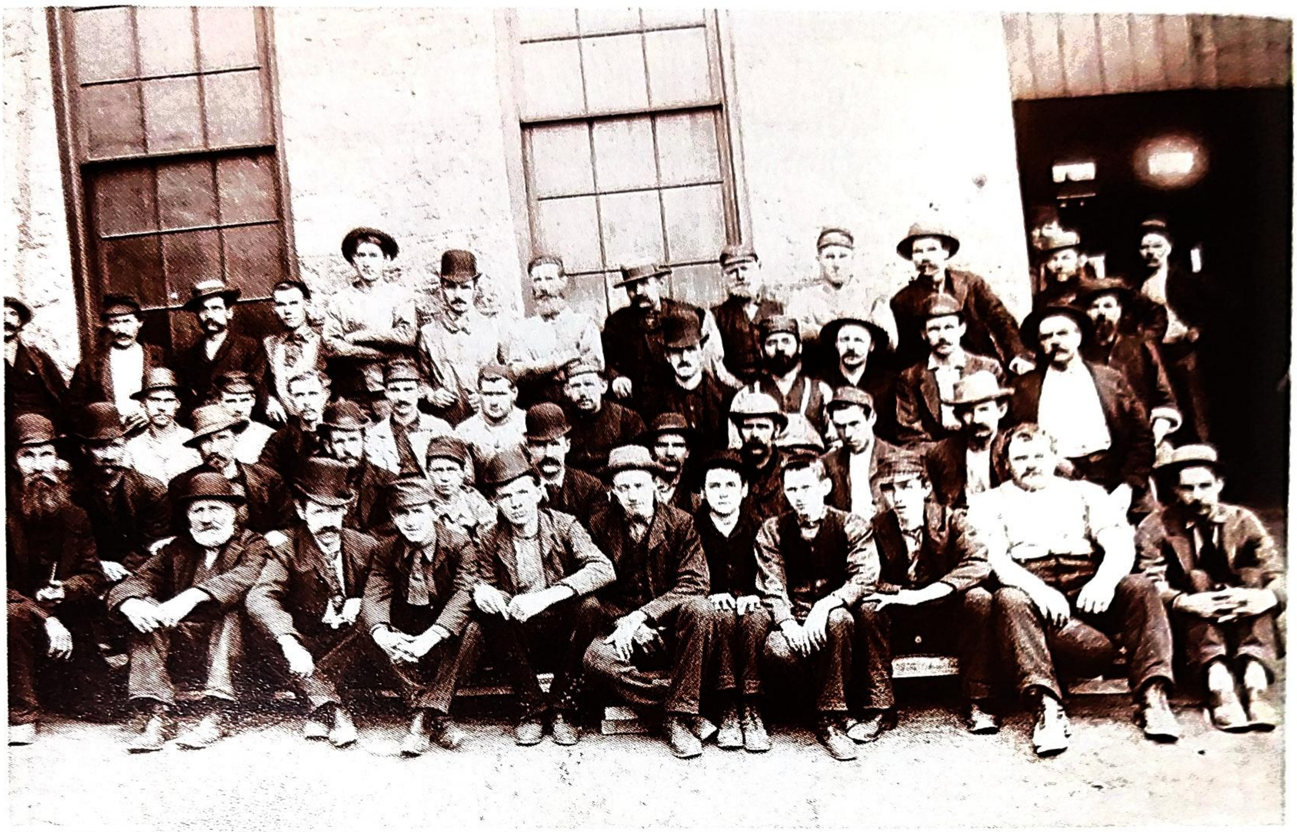
The first known sale by Goldie McCulloch & Co. of a Wheelock Steam Engine was to the Canadian Pacific Railroad in 1887 for installation in Montreal. This illustration of a typical single cylinder Wheelock Steam Engine is from the Company's catalogue 35-A (undated). One of these engines, built in about 1905, is still in daily operation at the Krug Brothers factory in Chesley, Ontario.



The Company's Catalogue No. 2 c. 1890, includes this illustration of one of its four horsepower "Model" gas and gasoline engines.

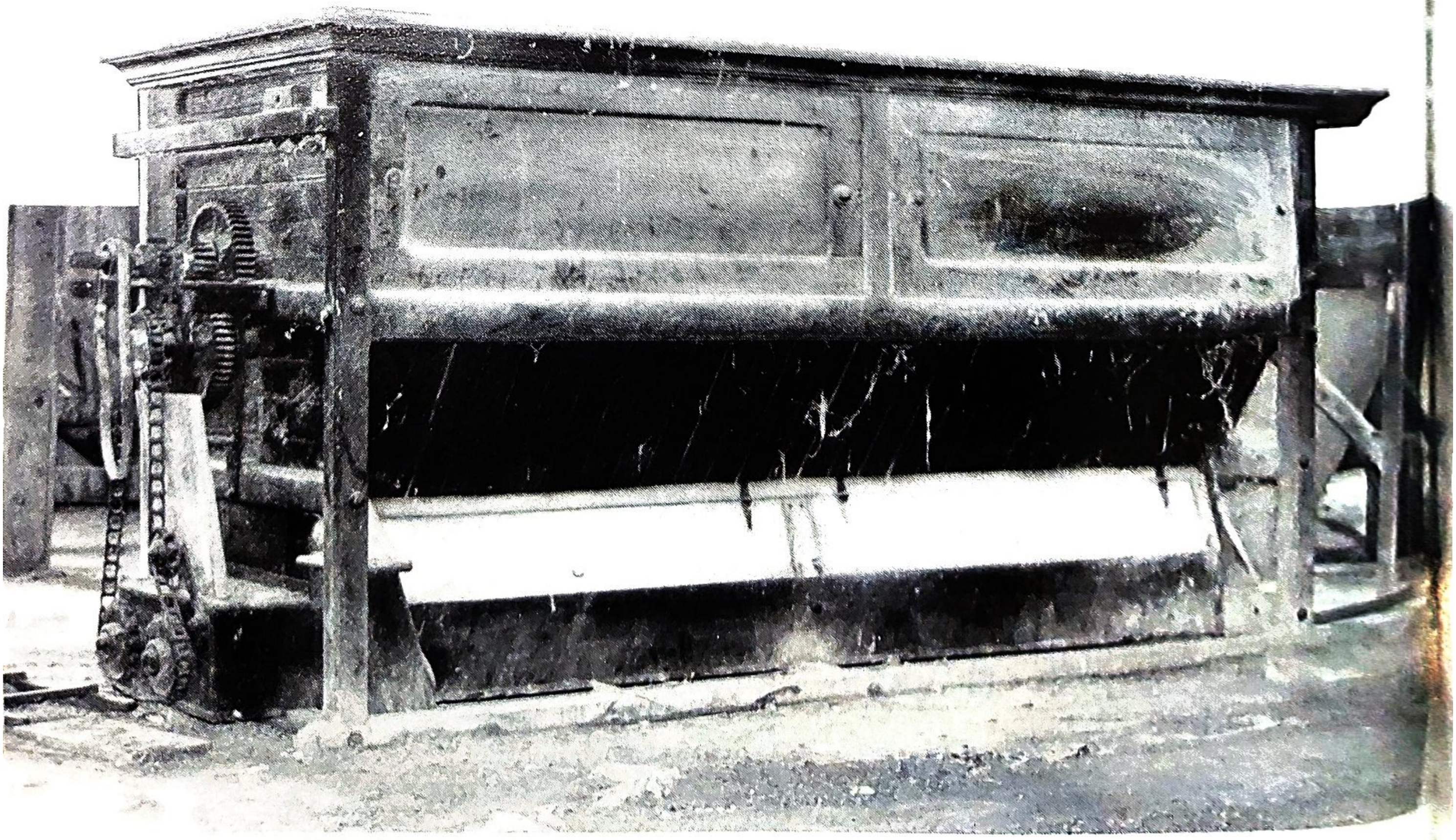


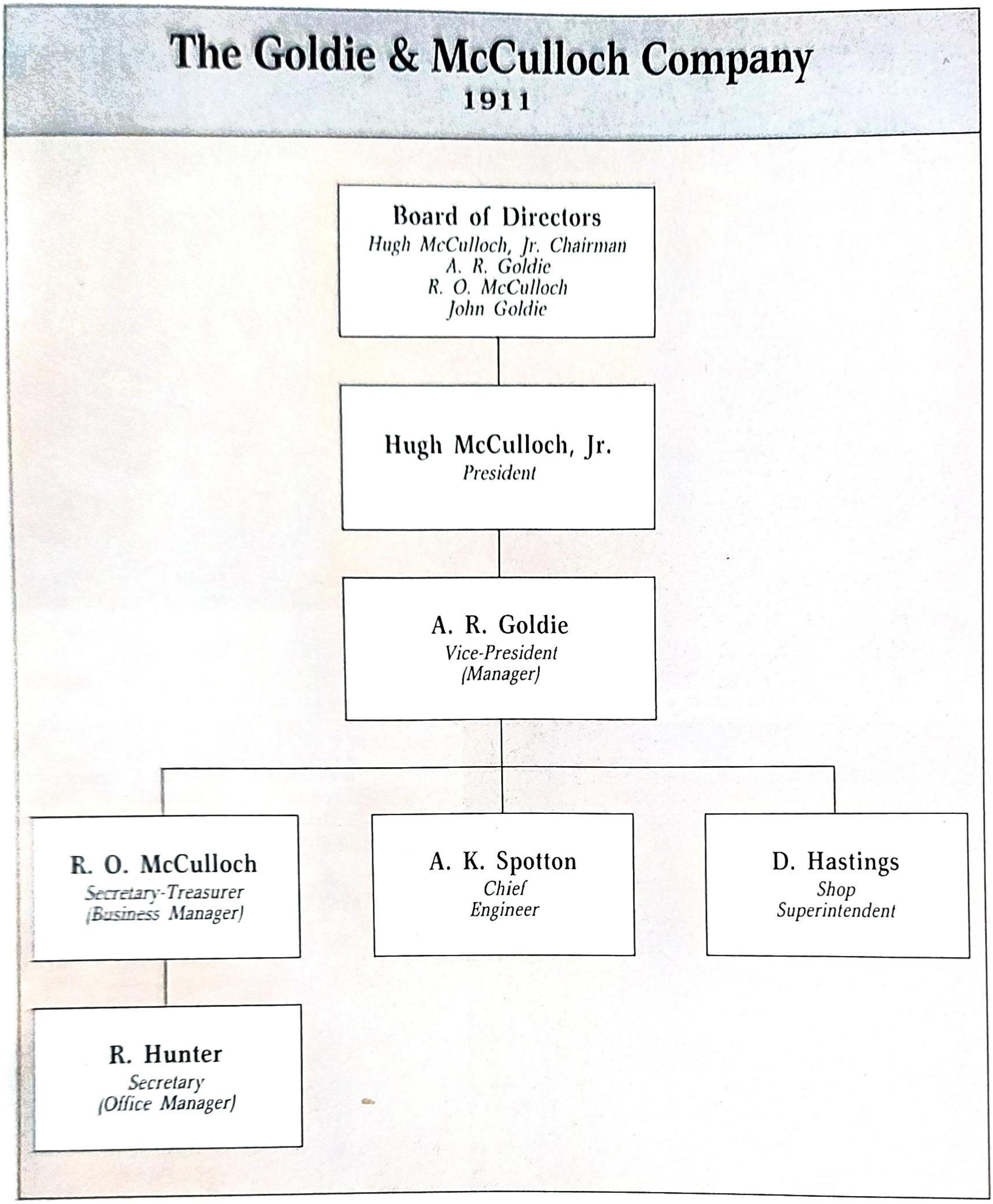
1867 Map indicating location of 'Goldie & McCulloch's' Foundry.



The oldest known photograph of employees of the Company is this 1889 photo of workers in the South Works.

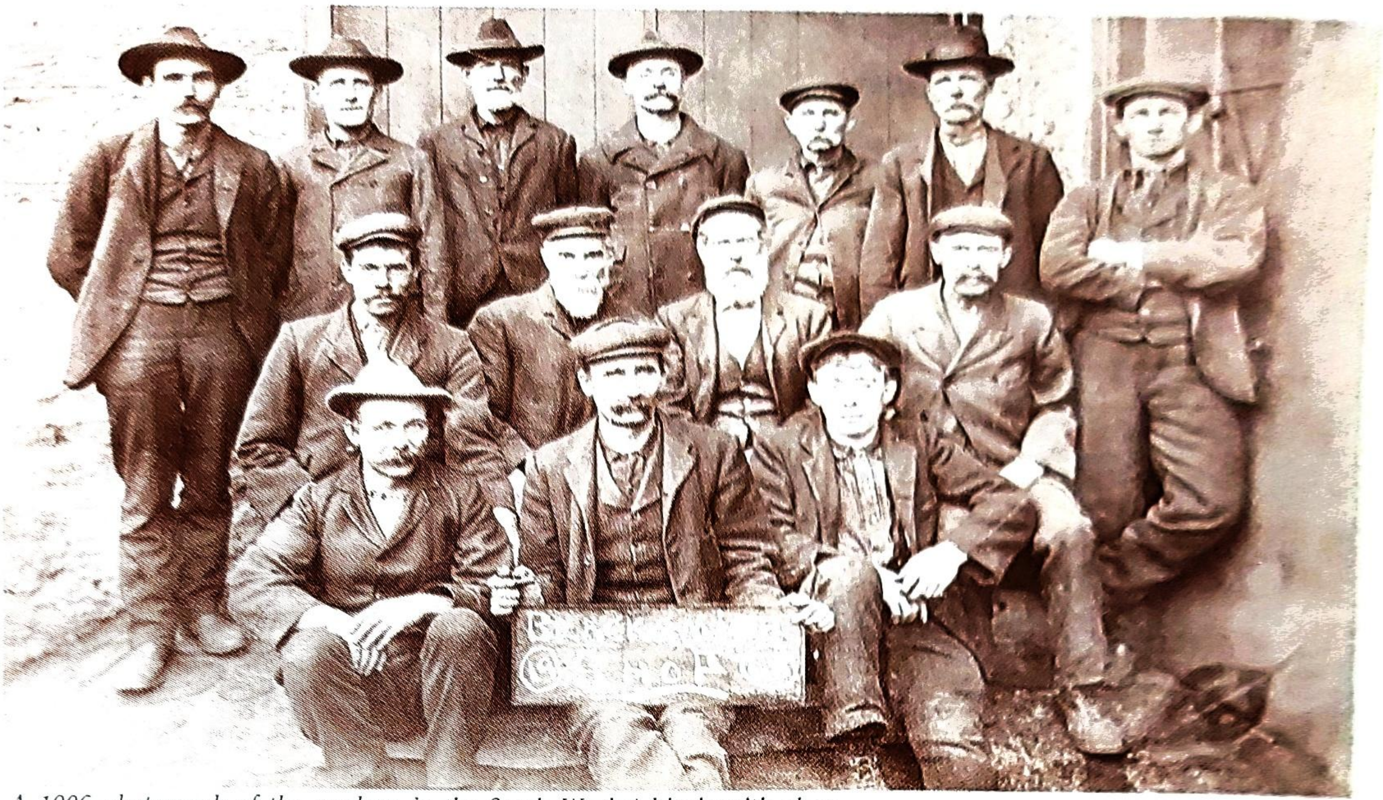
Below: This centrifugal bolt was typical of the milling equipment manufactured by the Company in the 1880's. It was manufactured in about 1884 for Stark's Mill in Paisley, Ontario. The photograph was taken in 1985. Goldie & McCulloch supplied Stark's Mill with about 15 major pieces of flour milling equipment with a capacity of 100 barrels per day (24 hours of operation) at a price of $9,000.



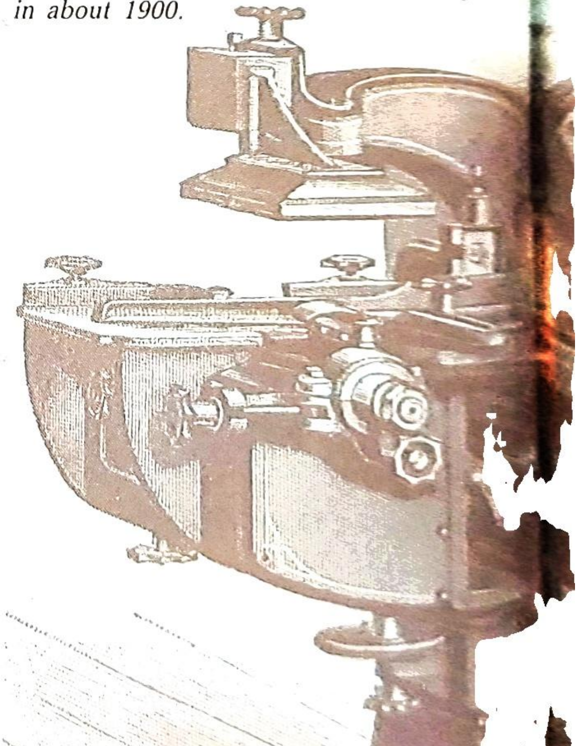


Organization of the Goldie & McCulloch Company in 1911.

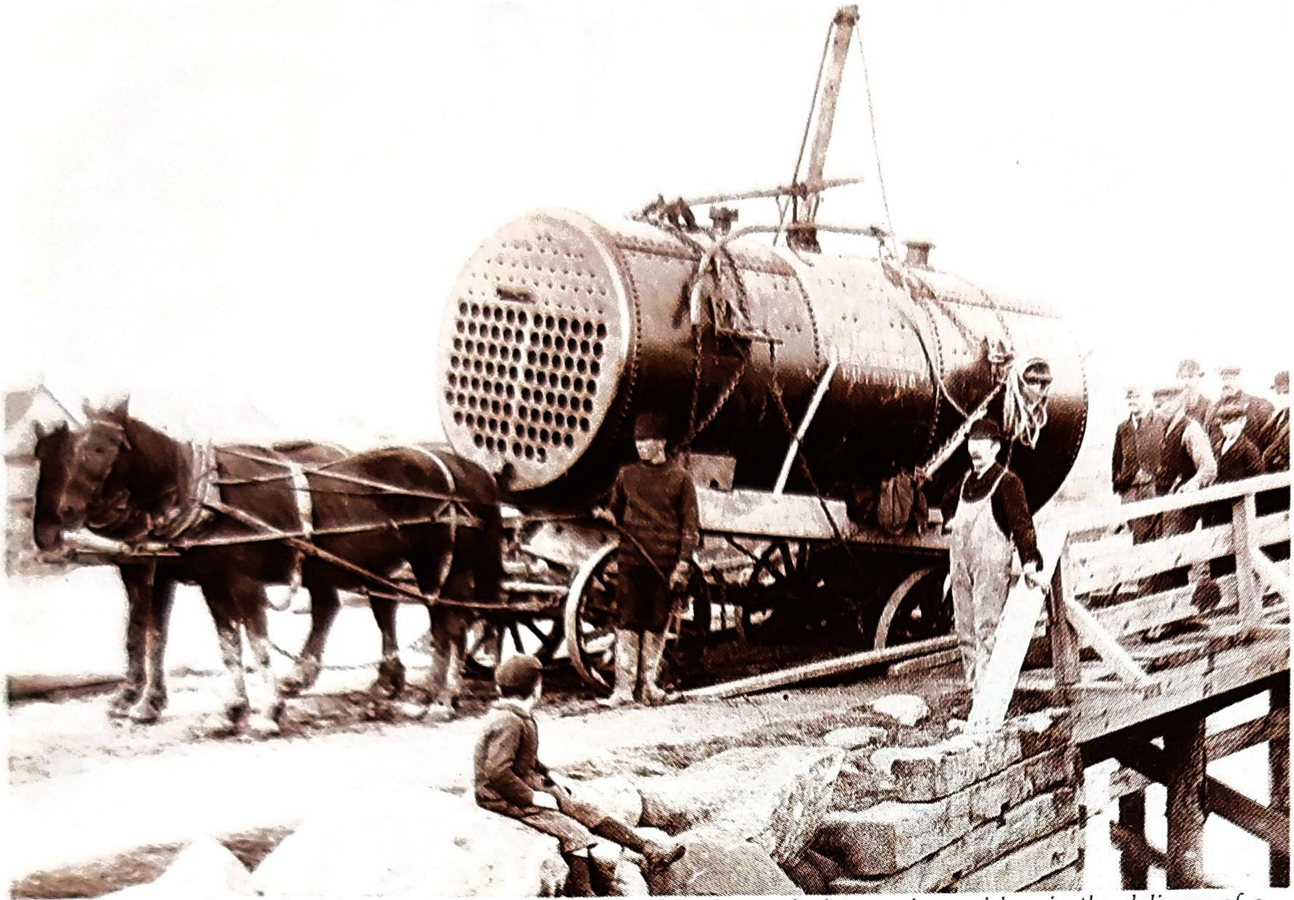
No organization charts of the Company are known to exist from before approximately 1960. In fact, company organization charts were not generally accepted nor in widespread use in the 1800's and early 1900's. The accompanying chart is drawn from records in the Company's files and the reporting relationships shown include some guesswork. Where a position had an official title per the Board of Director's minutes (e.g. Vice President) as well as a commonly used name (e.g. Manager), both are shown where known with the latter in parentheses.


A 1906 photograph of the workers in the South Works' blacksmith shop.

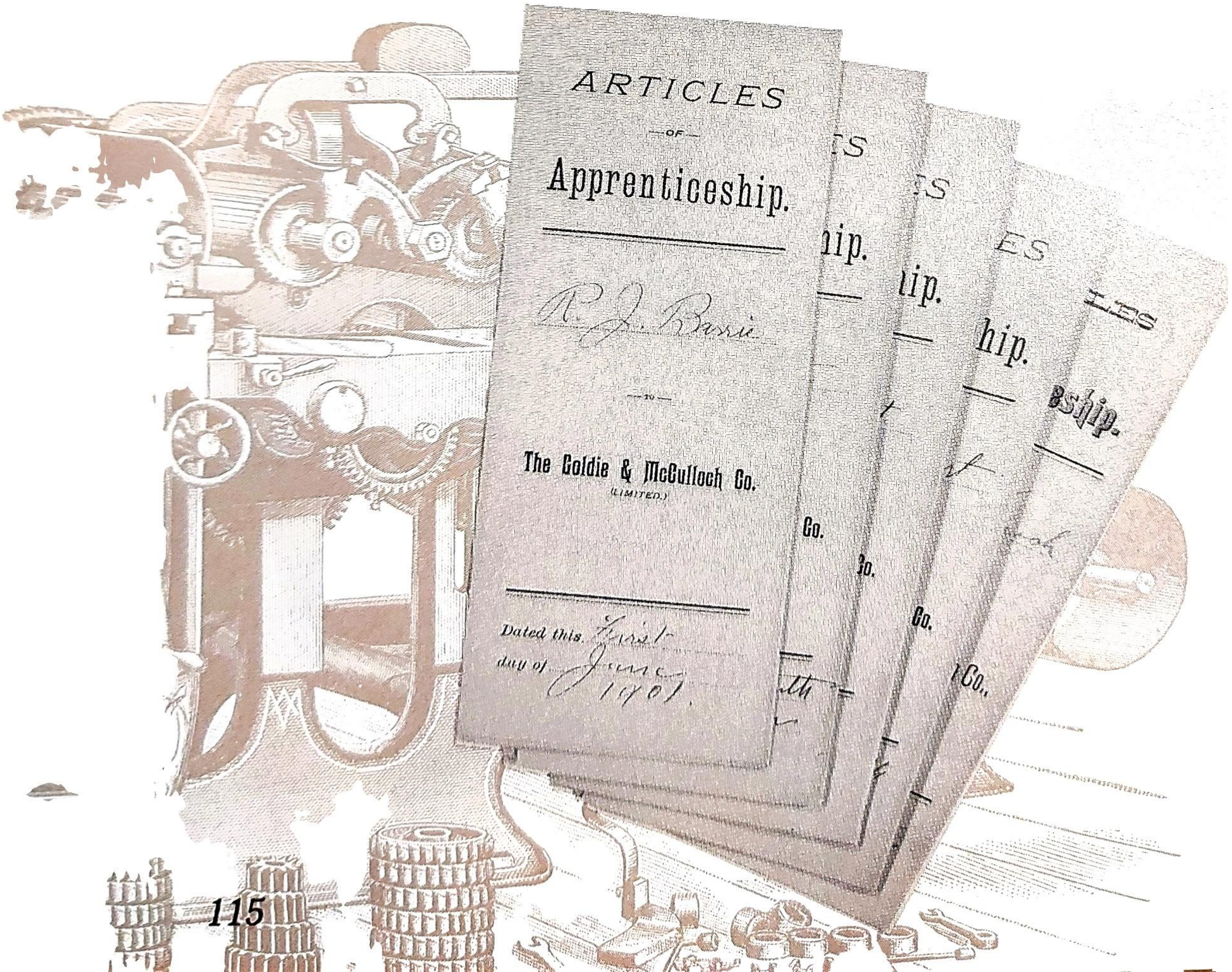
For many years, woodworking machinery [illegible] a major product line of the Company. The illustration of one of the Company's molding machines is from Catalogue No. 9 which is undated but is believed to have been printed in about 1900.



Robert Osborne McCulloch
President 1917-1931
Chairman of the Board
1932-1943



The Company produced firetube boilers for many years. This picture depicts a minor mishap in the delivery of a horizontal return tube (HRT) firetube boiler to the Thessalon Pulp and Paper Company in Thessalon, Ontario. The boiler was shipped from the Goldie & McCulloch Company Limited works on September 18, 1901.



ARTICLES

—OF—

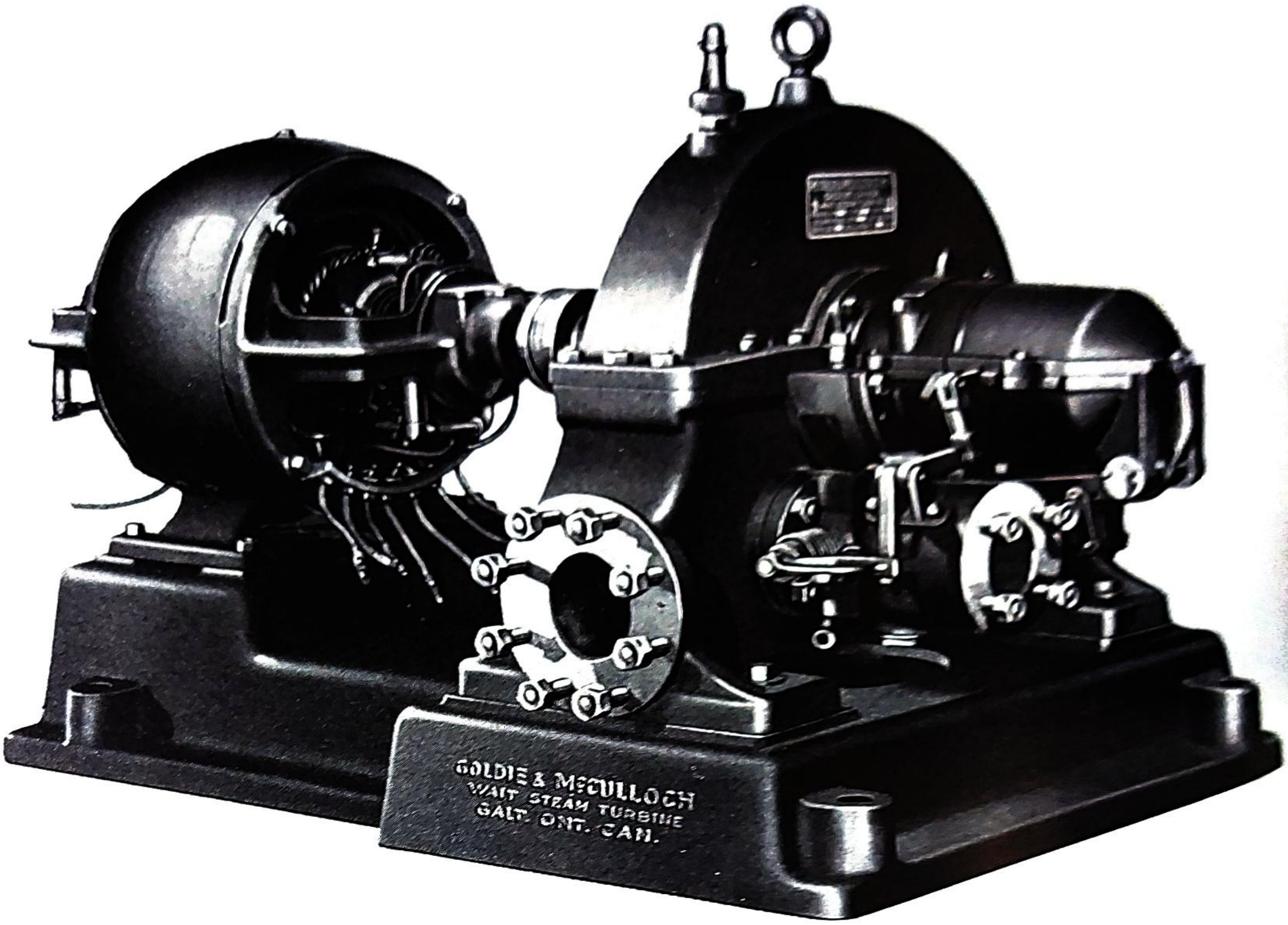
Apprenticeship.

R. J. Barrie

—TO—

The Goldie & McCulloch Co.
(LIMITED.)

Dated this First
day of June
1901.

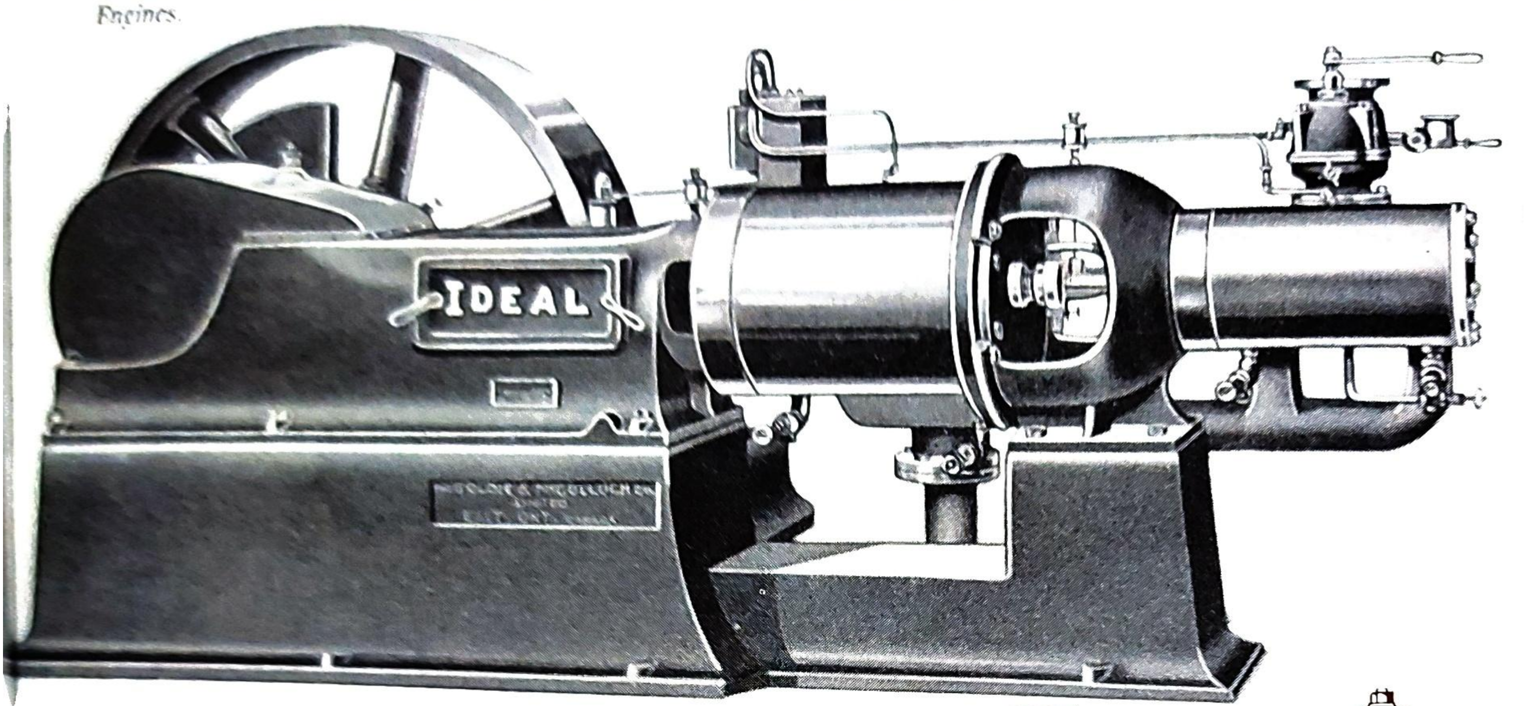


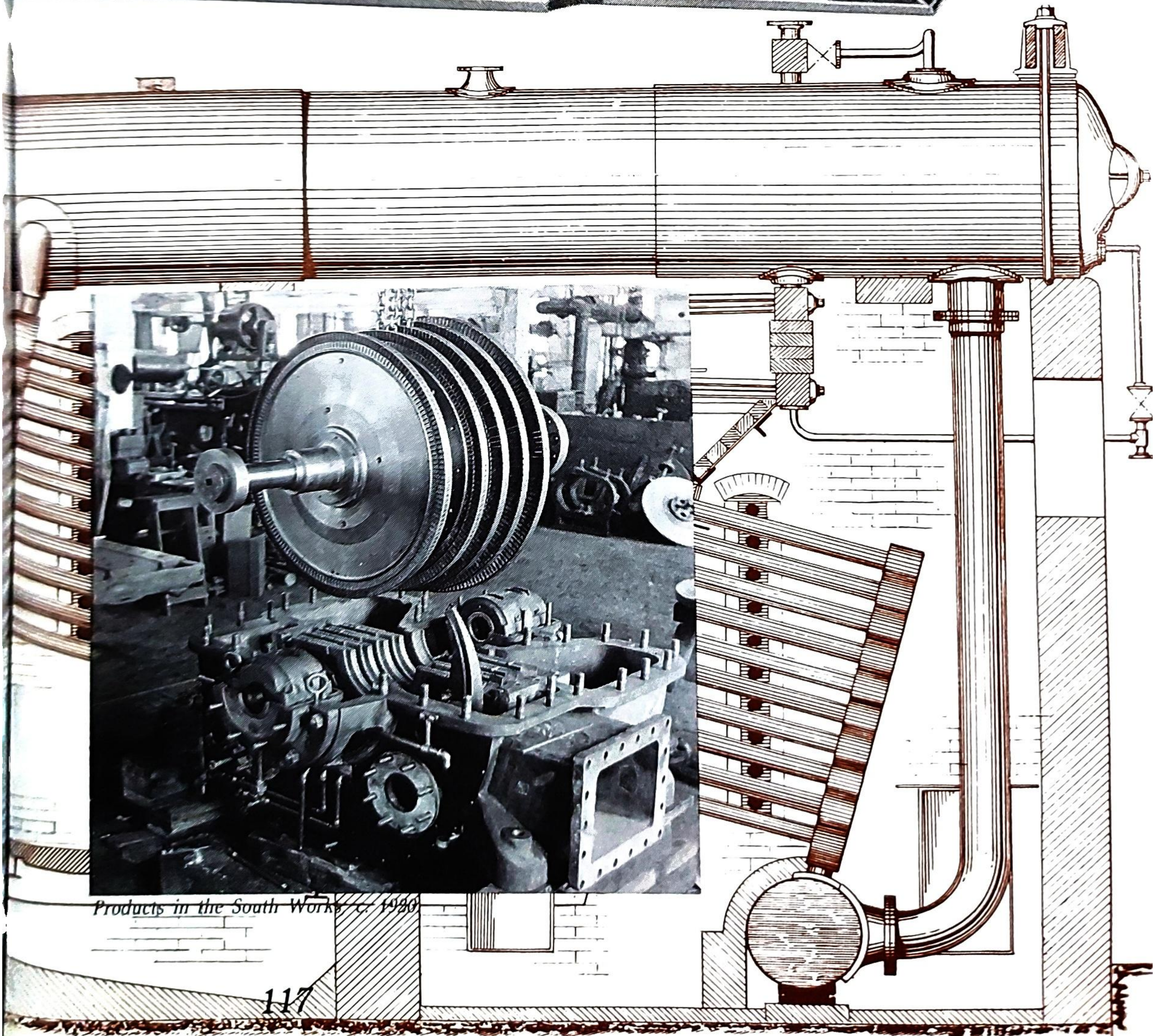
An illustration from the Company's Bulletin No. 38 dated June 1919 depicting a Goldie & McCulloch "Wait" steam turbine connected to a generator.

Right: Goldie & McCulloch Bulletin No. 30 dated March, 1914, is the earliest known catalog of the Company that addresses water tube boilers. This illustration of a Type A boiler with superheater is from that bulletin.

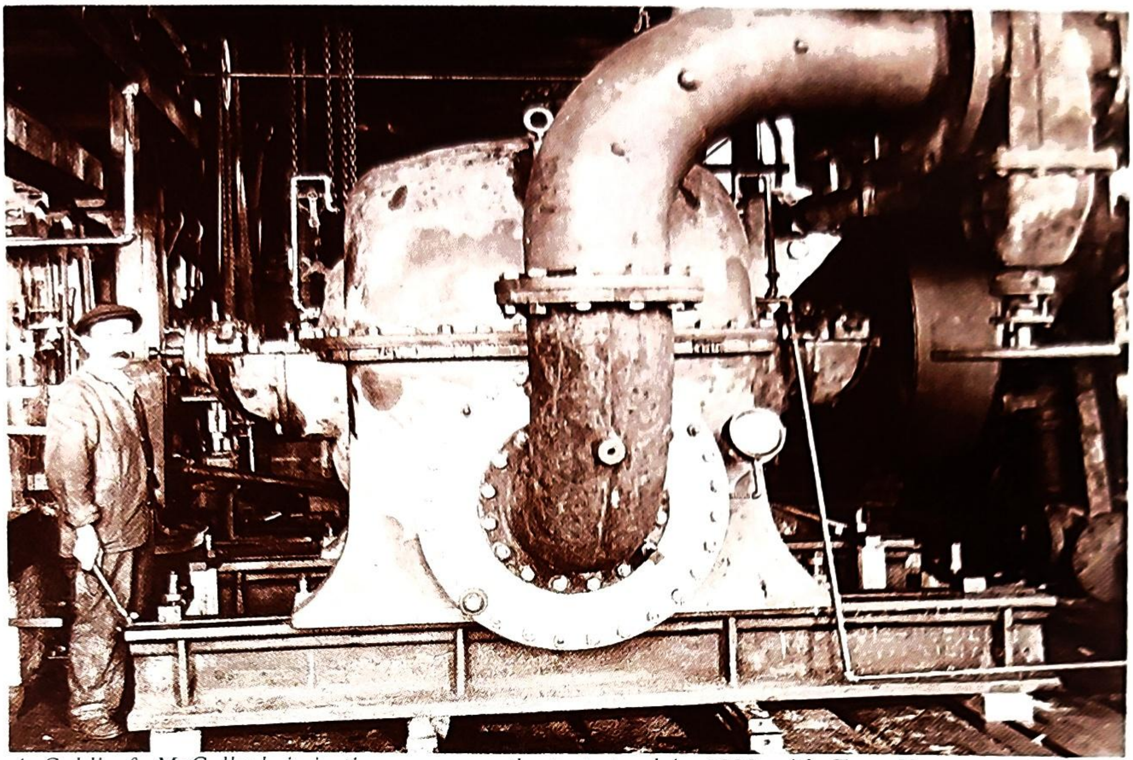
The oldest existing photograph of the North Works is this photo which dates from about 1910.

This illustration is from Goldie & McCulloch's June 1913 catalog entitled Side Crank Ideal High Speed Steam Engines.

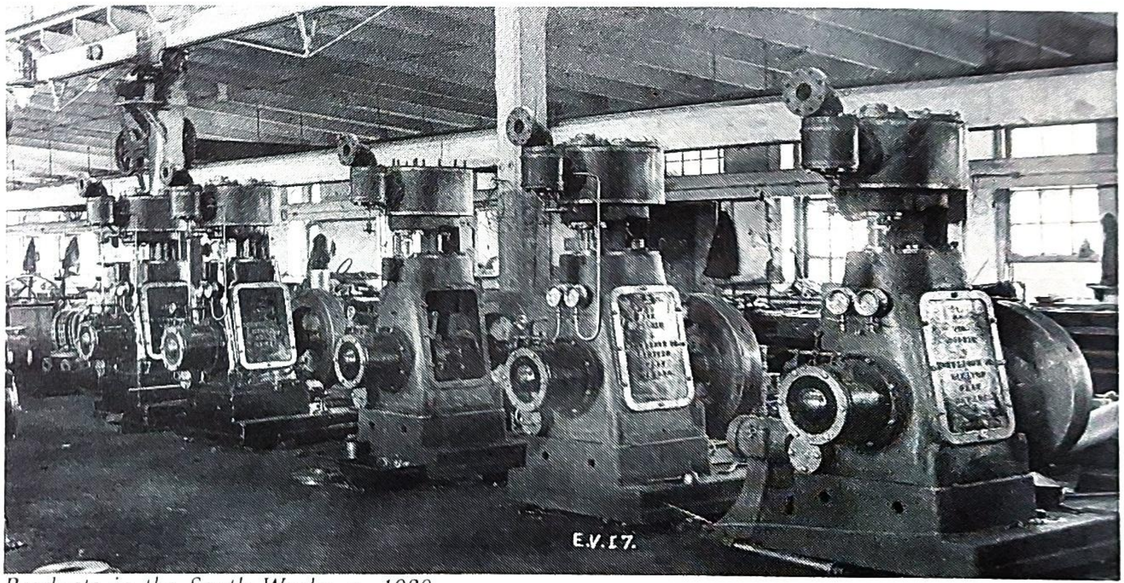




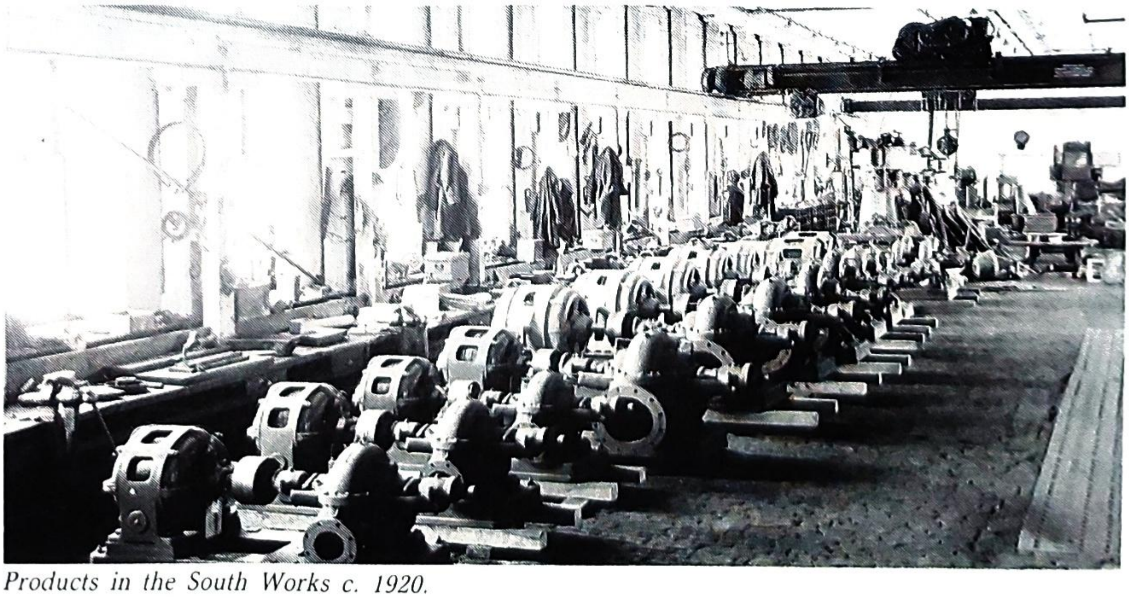
Products in the South Works, c. 1920



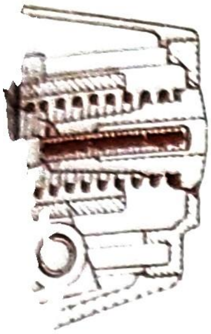
A Goldie & McCulloch irrigation pump on the test stand in 1920 with Tom Hope, mechanic.

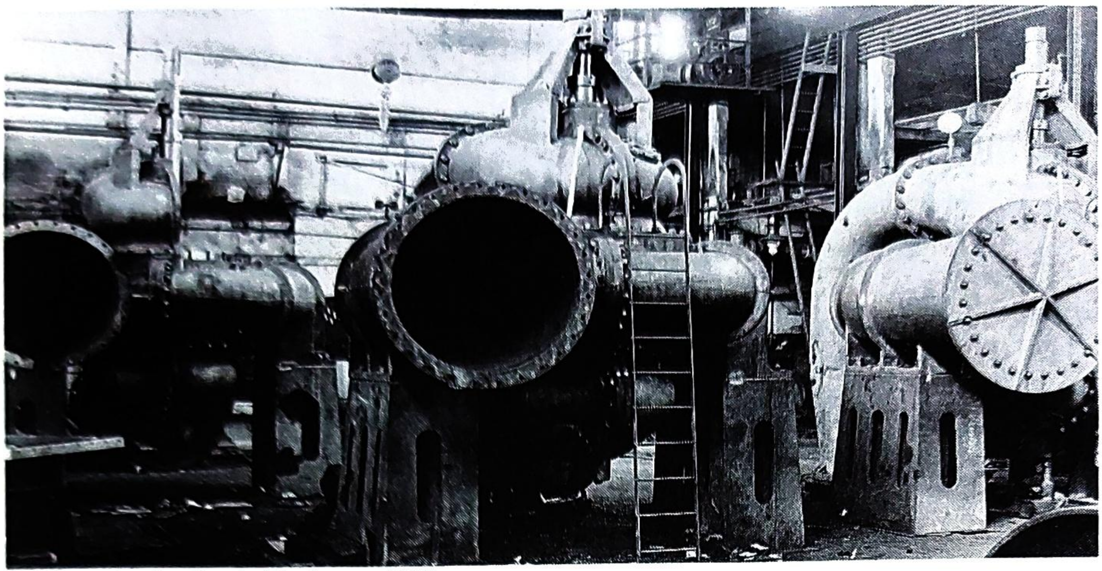


Products in the South Works, c. 1920.

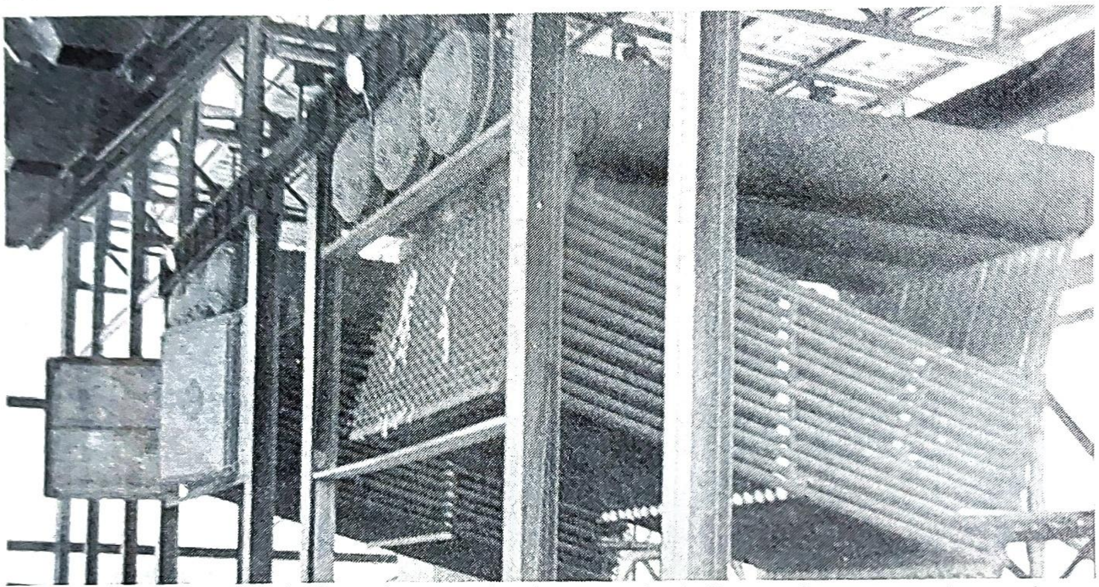


Products in the South Works c. 1920.

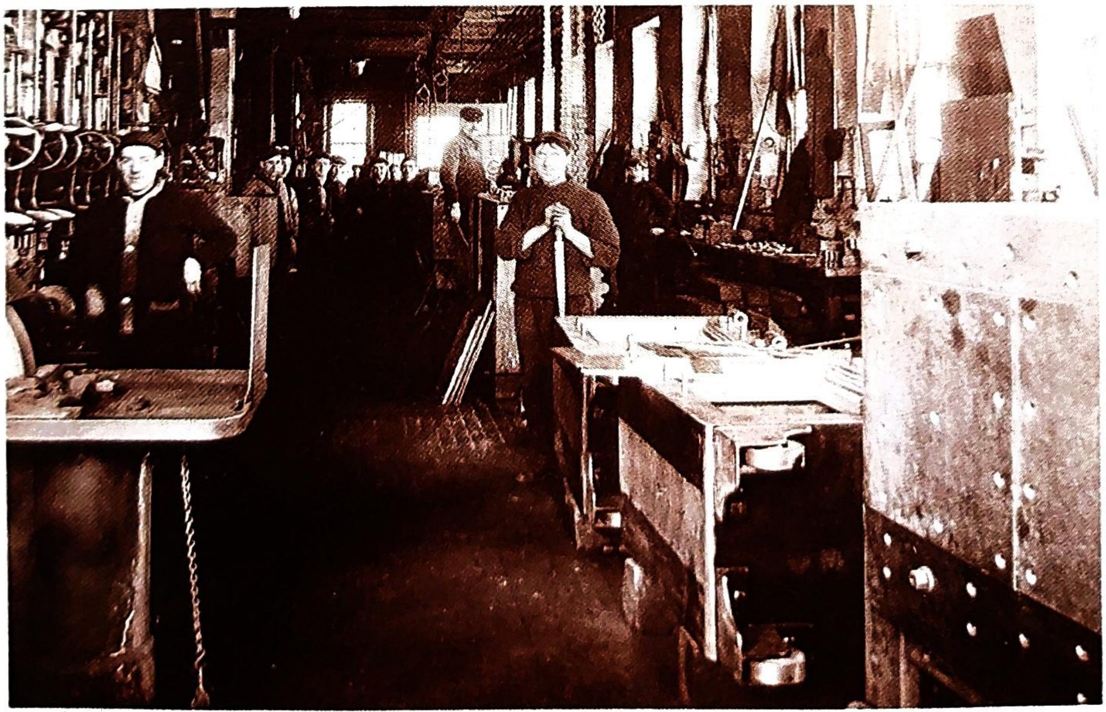




Products in the South Works, c. 1920.



Two Goldie & McCulloch three drum sectional water tube boilers under construction at the Amherstburg, Ontario plant of Brunner Mond Canada, Ltd. The illustration is from Bulletin No. 40, *April, 1922.*

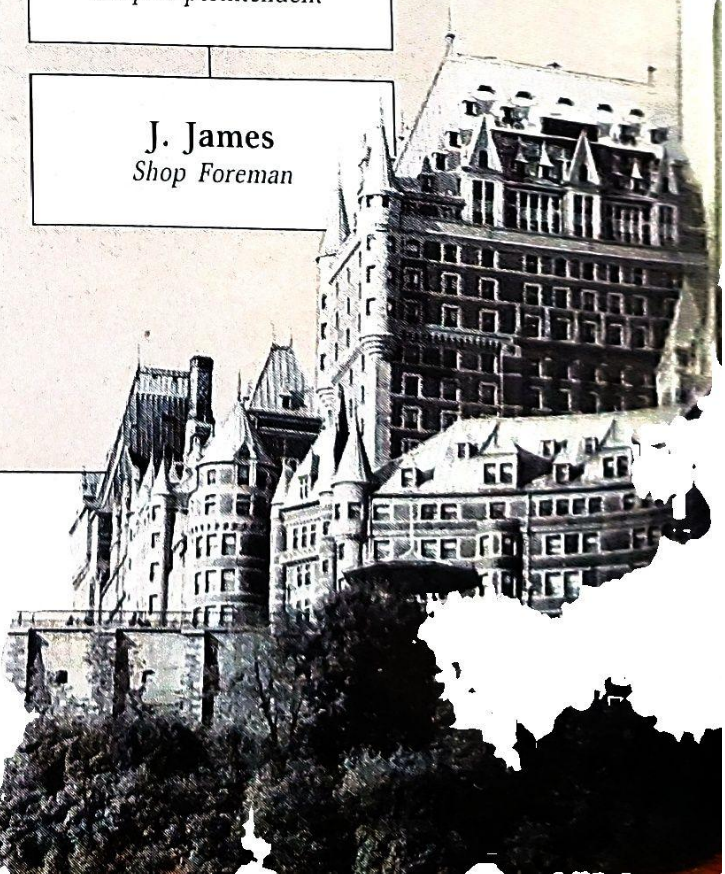


Workers in the safe works on Grand Avenue, c. 1920.

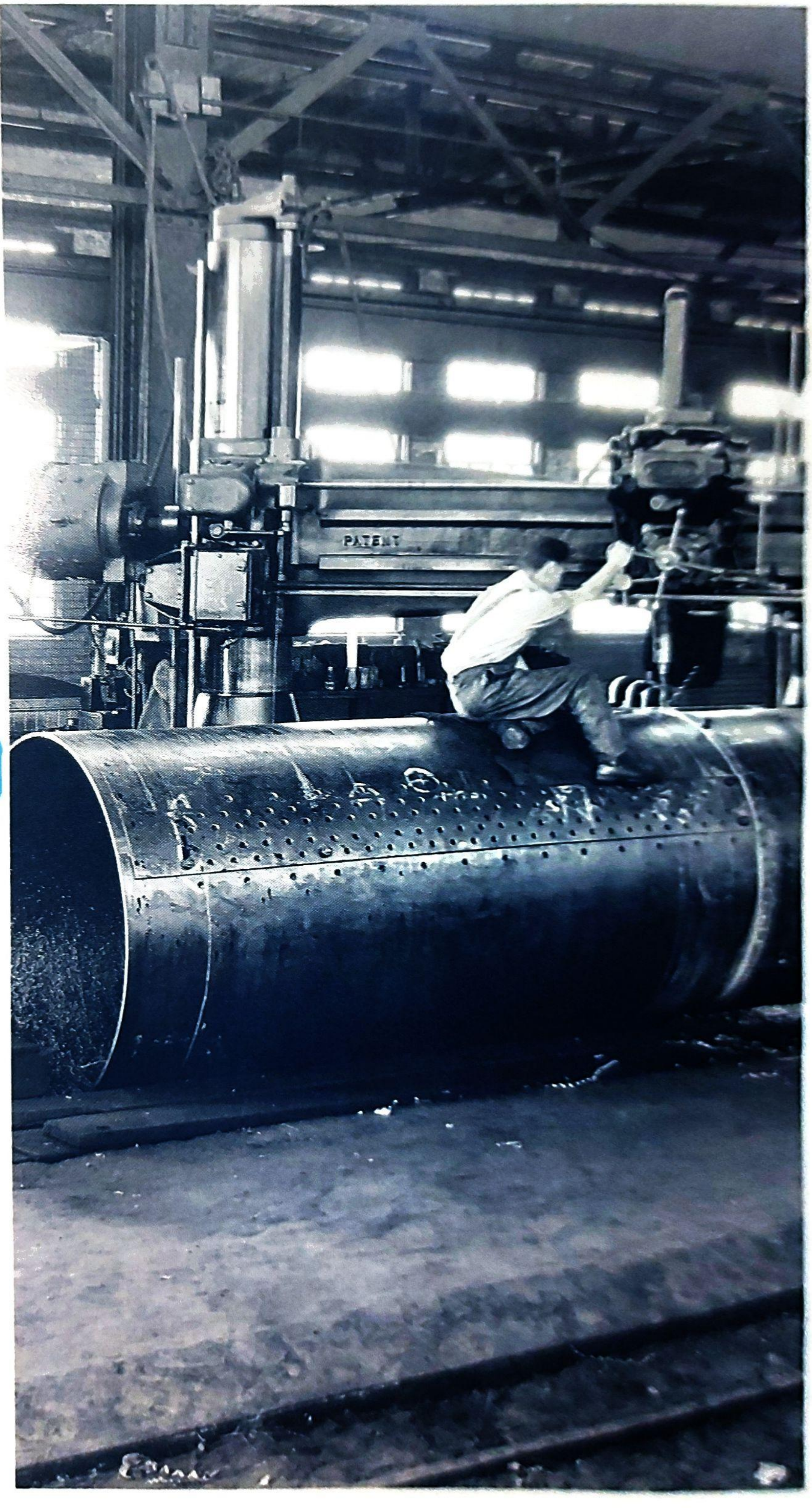
The Goldie & McCulloch Company
1923

- **Board of Directors**
  R. O. McCulloch, Chairman
  A. R. Goldie
  A. L. McCulloch
  H. L. McCulloch
  J. G. Goldie
  - **R. O. McCulloch** *President*
    - **A. R. Goldie** *Vice President and General Manager*
      - **A. C. Fleming** *Secretary-Treasurer*
      - **J. G. Goldie** *Safes*
      - **A. K. Spotton** *Chief Engineer*
      - **R. Hunter** *Foundry Superintendent*
        - **J. McEwan** *Pattern Shop Foreman*
          - **P. Kidd** *Forge Foreman*
      - **D. Hastings** *Shop Superintendent*
        - **J. James** *Shop Foreman*

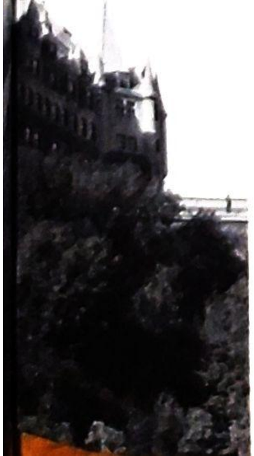
Organization of Goldie & McCulloch Company Limited prior to the amalgamation.

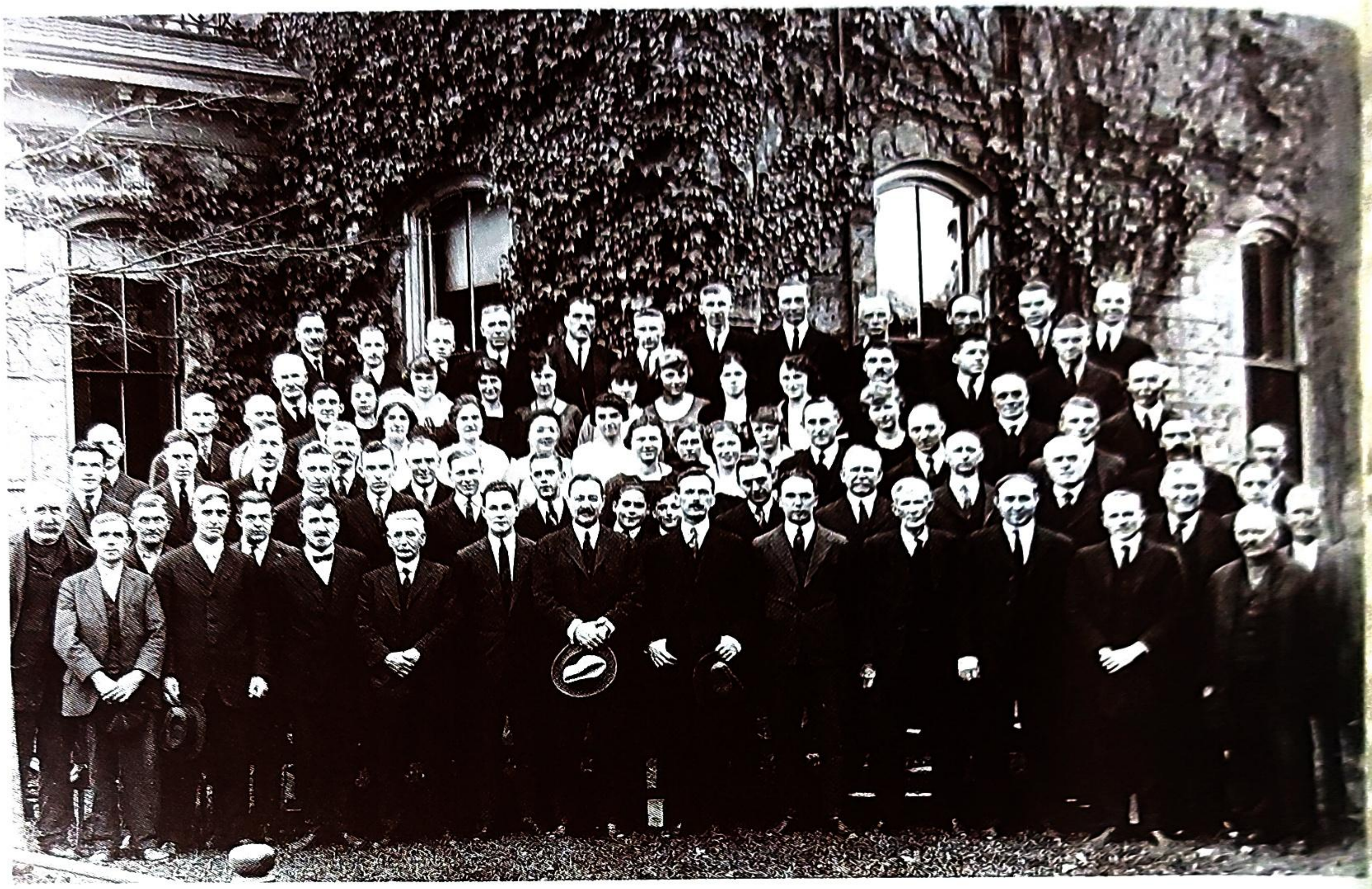


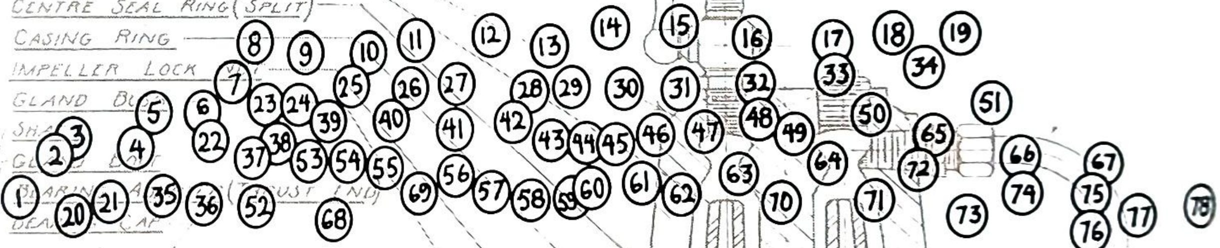
Drilling rivet holes in a rivetted drum in the North Works in the early 1930's.



Below:
The Company has long supplied equipment to some of the most famous landmarks in Canada. In 1922, Goldie McCulloch supplied three Type D Cross Drum Sectional Water Tube Boilers to the Chateau Frontenac in Quebec City.

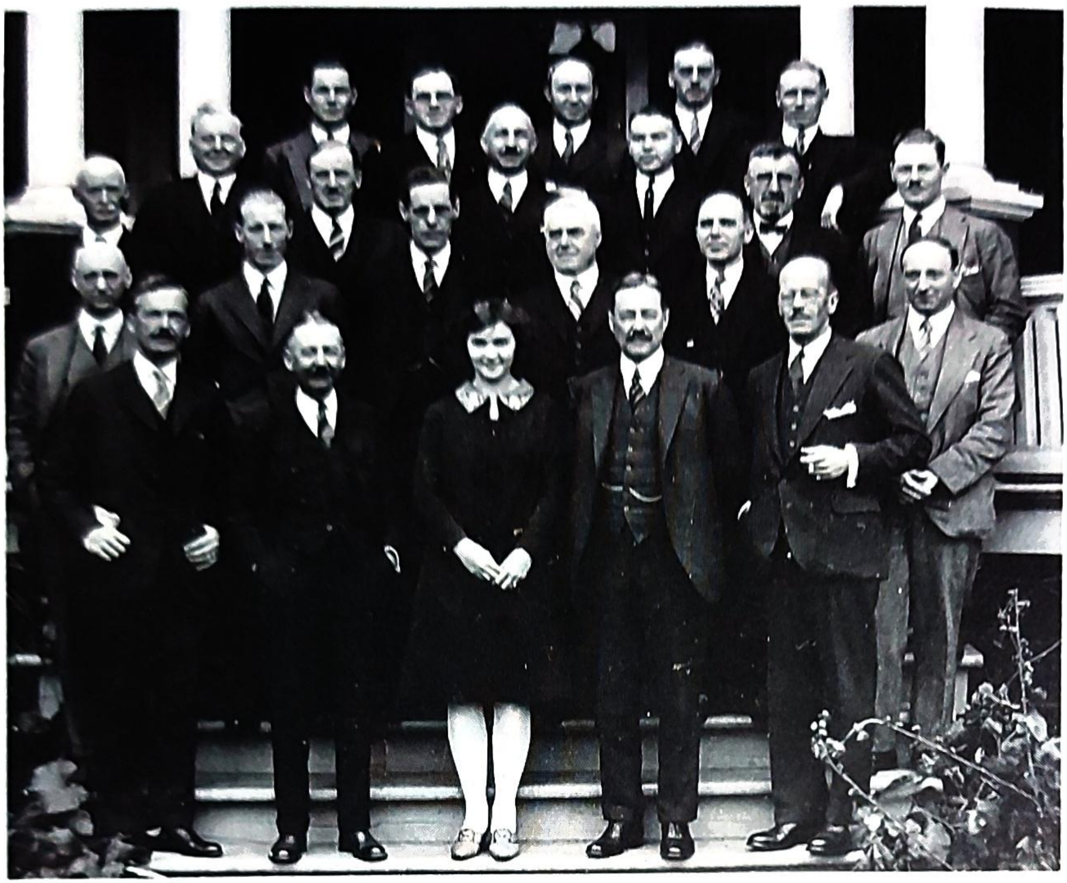


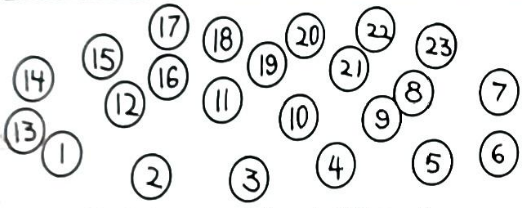




Goldie & McCulloch Company Limited, head office and works staff, 1923.

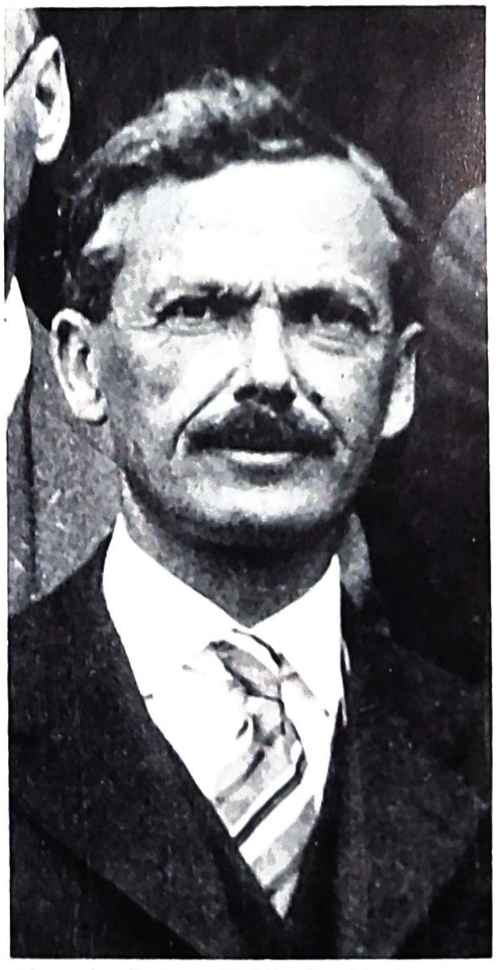
1. P. KIDD Forge Foreman
2. J. ROBINSON Draftsman
3. A. F. CRAWFORD Sales
4. C. A. DORSCHELL Cost
5. A. C. FLEMING Secretary Treasurer
6. W. DUCKER Cost
7. R. TURNBULL Service
8. P. BALLINGALL Mail
9. H. MURRAY Stores
10. F. SPRY Draftsman
11. A. CARTER Boiler Shop
12. J. McEWAN Pattern Shop Foreman
13. DICK BELL Office
14. E. SCOTT Office
15. TOM JONES Shop Foreman
16. D. ANDERSON Sales Service
17. A. KRUSE Sales
18. J. WILSON Planning
19. W. SASS Accounting
20. C. HIRST Shipping
21. R. MITCHELL Foundry
22. G. H. WILKES Engineer
23. W. BEAVER Sales
24. E. QUARRIE
25. C. WEIR Steno
26. MISS LINTON Steno
27. O. MASON Steno
28. MISS WILSON Telephone
29. L. BEATTIE Steno
30. E. DEANS Purchasing
31. L. UNWIN Steno
32. A. LAMBTON Sales
33. G. HIMELSPACH Sales
34. O. ROBERTSON Sales
35. J. WARING Shipper
36. H. PARKINSON Draftsman
37. R. M. DILLY Sales
38. R. BAIRD B/M
39. MISS ROBINSON Nurse
40. J. BLUNDY Purchasing Dept.
41. T. LAST Purchasing Dept.
42. L. KERR Stenographer
43. E. HOWES Planning
44. MISS HENDERSON Correspondent File
45. M. HOWES Planning
46. M. DIXON Planning
47. T. G. ELLIOTT Purchasing Agent
48. V. HOWES Planning
49. P. L. EVANS Eng. Dept.
50. E. KENNEY Planning
51. F. JOHNSON Wood Shop
52. D. HASTINGS Shop Superintendent
53. W. SMITH Cost
54. J. UNWIN B/M
55. W. WILLIAMSON Draftsma
56. D. WINTON Draftsman
57. R. O. McCULLOCH Presid
58. W. WICKENS Mail
59. S. LAMBTON Drafting Room
60. A. R. GOLDIE V.P. & Gen. M
61. J. BIGGAR Shop Foreman
62. J. GOLDIE Sales
63. C. McDONALD Bookkeeper
64. A. K. SPOTTON Chief Engi
65. C. SMITH Tool maker
66. J. WEEPERS Boiler Shop
67. W. CATION Boiler Shop
68. R. HUNTER Foundry Super
69. L. McCULLOCH Office
70. J. McGREGOR Engineer
71. R. ELLIOT Drafting Room
72. W. G. BISHOP Sales
73. E. SHAVER Orders
74. W. McBRIDE Sales
75. R. BULLOCK Cost
76. W. DIXON Blacksmith
77. J. BARTON Yard
78. E. F. HETHERINGTON Ad



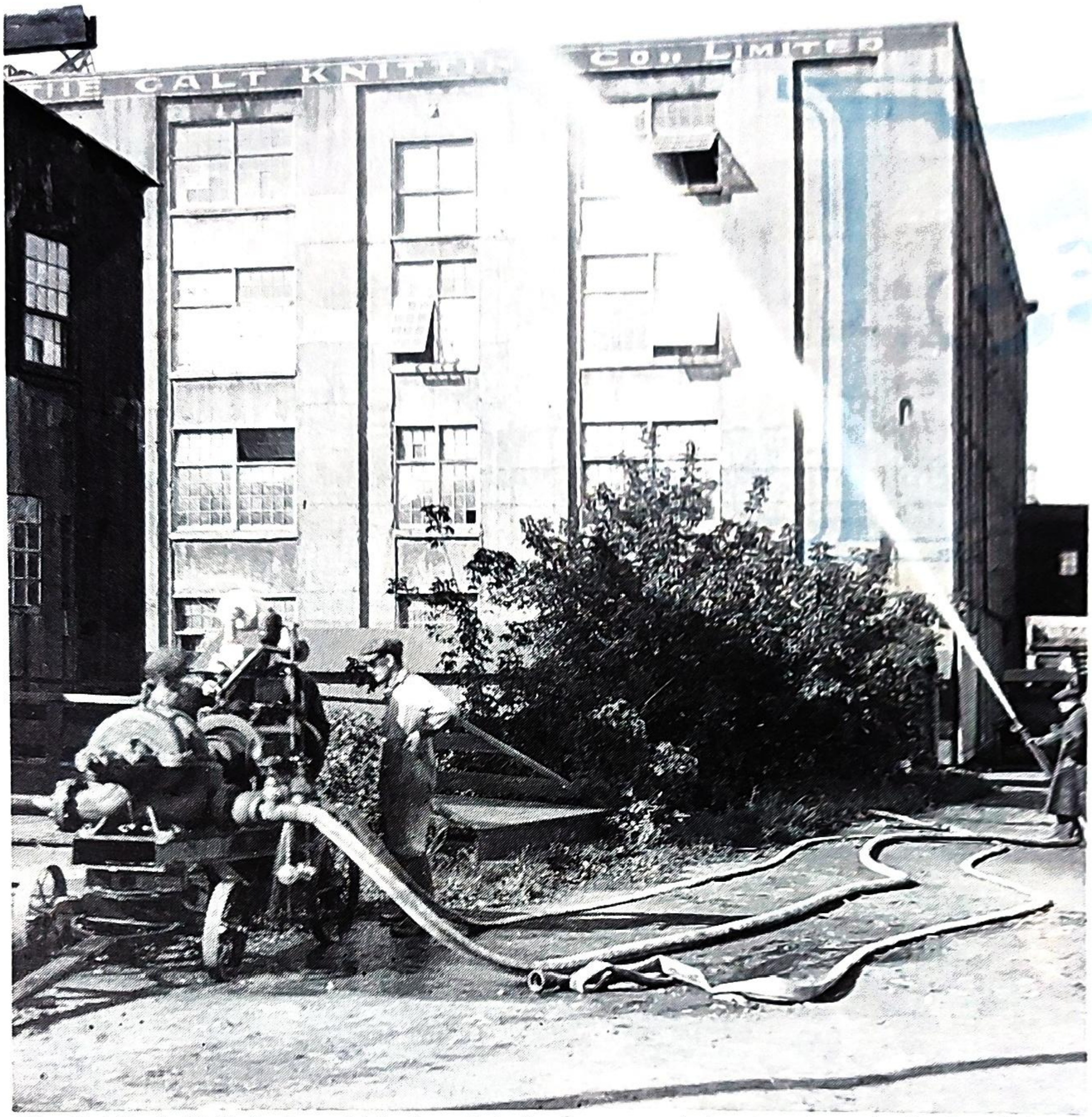


The staff of the new Babcock-Wilcox & Goldie-McCulloch Company at the amalgamation dinner on November 1, 1923 at the Clovelly Tea Room in Galt. This picture was taken in front of the golf club (currently the Galt Country Club).

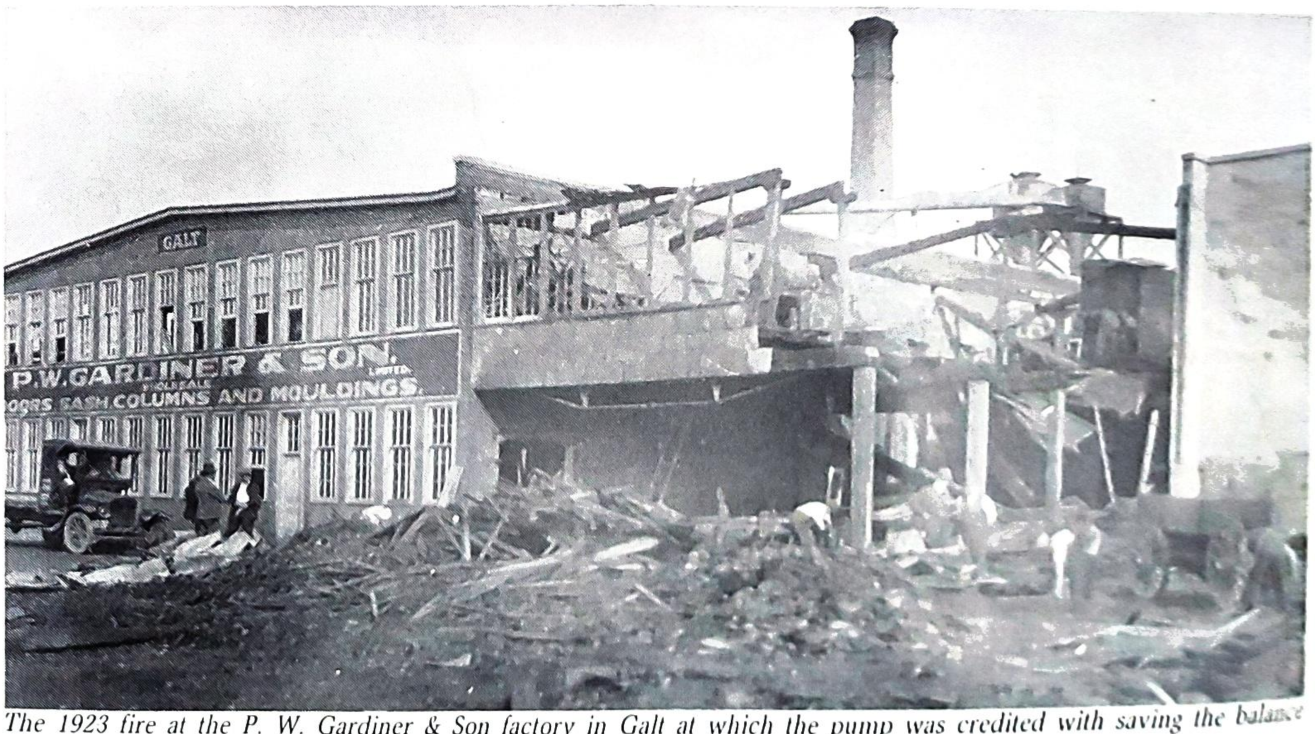
1. *A. R. GOLDIE Vice President*
2. *ARTHUR PRATT B&W US*
3. *MISS CHRISSIE D. WEIR, Secretary to R. O. McCulloch*
4. *R. O. McCULLOCH President*
5. *"BUDGE" MILLS*
6. *PERCY L. EVANS Draftsman*
7. *HUGH L. McCULLOCH*
8. *DAVID HASTINGS Shop Supt.*
9. *G. DICKSON*
10. *W. G. BISHOP Sales*
11. *DUNNELL Manager B.C. Office*
12. *DAVID ANDERSON Sales*
13. *A. K. SPOTTON Chief Engineer*
14. *D. ANDERSON*
15. *UNKNOWN*
16. *UNKNOWN*
17. *A. L. McCULLOCH Sales*
18. *EARL HETHERINGTON Advertising Mgr.*
19. *A. FITZGERALD CRAWFORD Sales*
20. *ROBERT ELLIOT Purchasing Agent*
21. *JAMES G. WILSON Planning*
22. *J. O. TWINBERROW Mechanical Engineer came from and later returned to B&W Great Britain*
23. *WARDMAN*



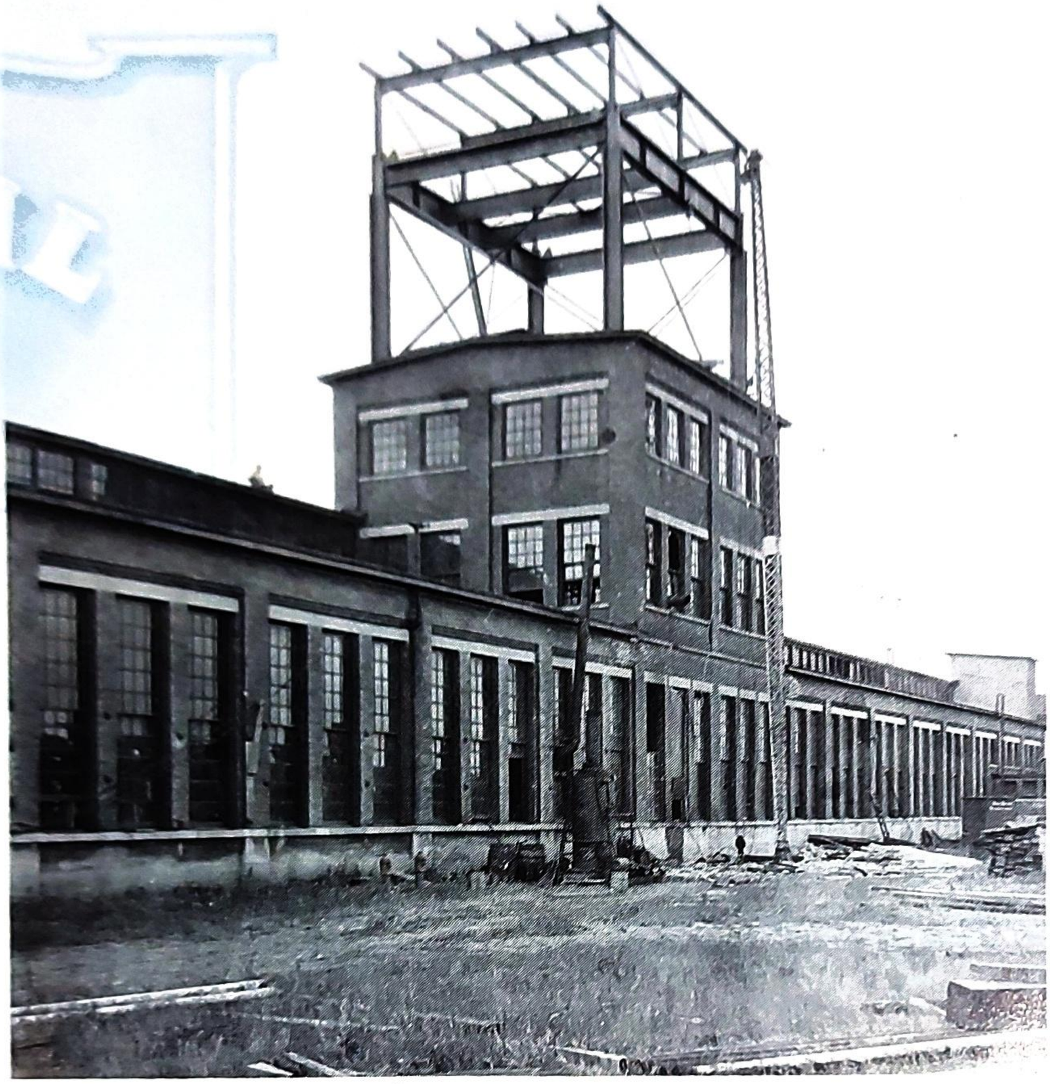
Alexander Rodgers Goldie President 1932-1934 Chairman of the Board 1934-1951.



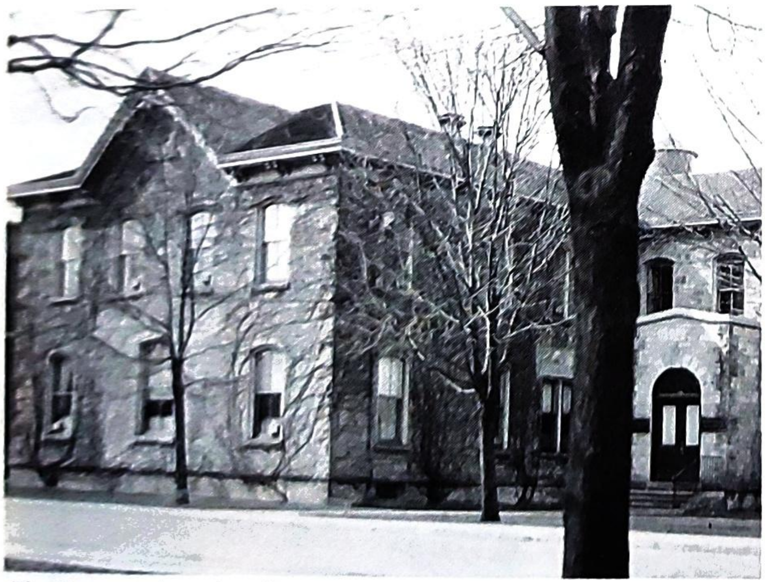
The Goldie & McCulloch portable Rees Roturbo fire pump being tested on the banks of the Grand River near the Company's South Works. c. 1923


GALT
P. W. GARDINER & SON LIMITED
DOORS SASH COLUMNS AND MOULDINGS

The 1923 fire at the P. W. Gardiner & Son factory in Galt at which the pump was credited with saving the balance of the building.

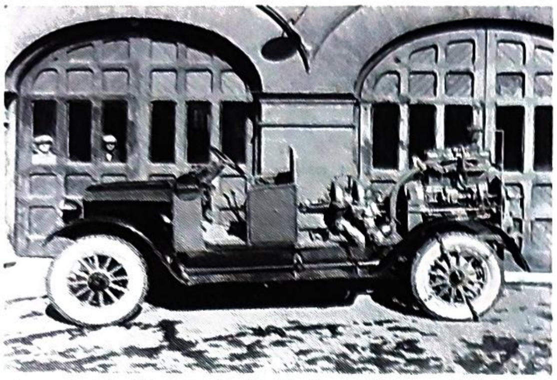


The "Bull Tower" under construction, c. 1926.

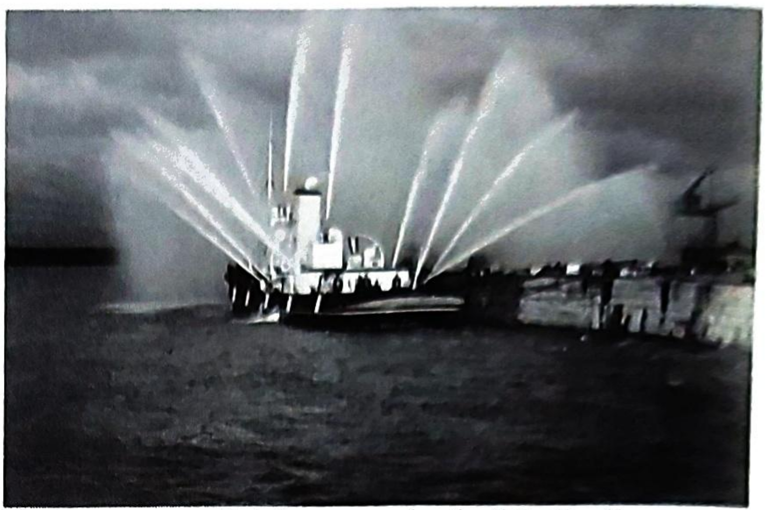


The Company's main office as it appeared on March 23, 1930. This office was located at the South Works on Grand Ave. The Company's headquarters was relocated to the North Works in December, 1955 and this building was torn down in the spring of 1965.

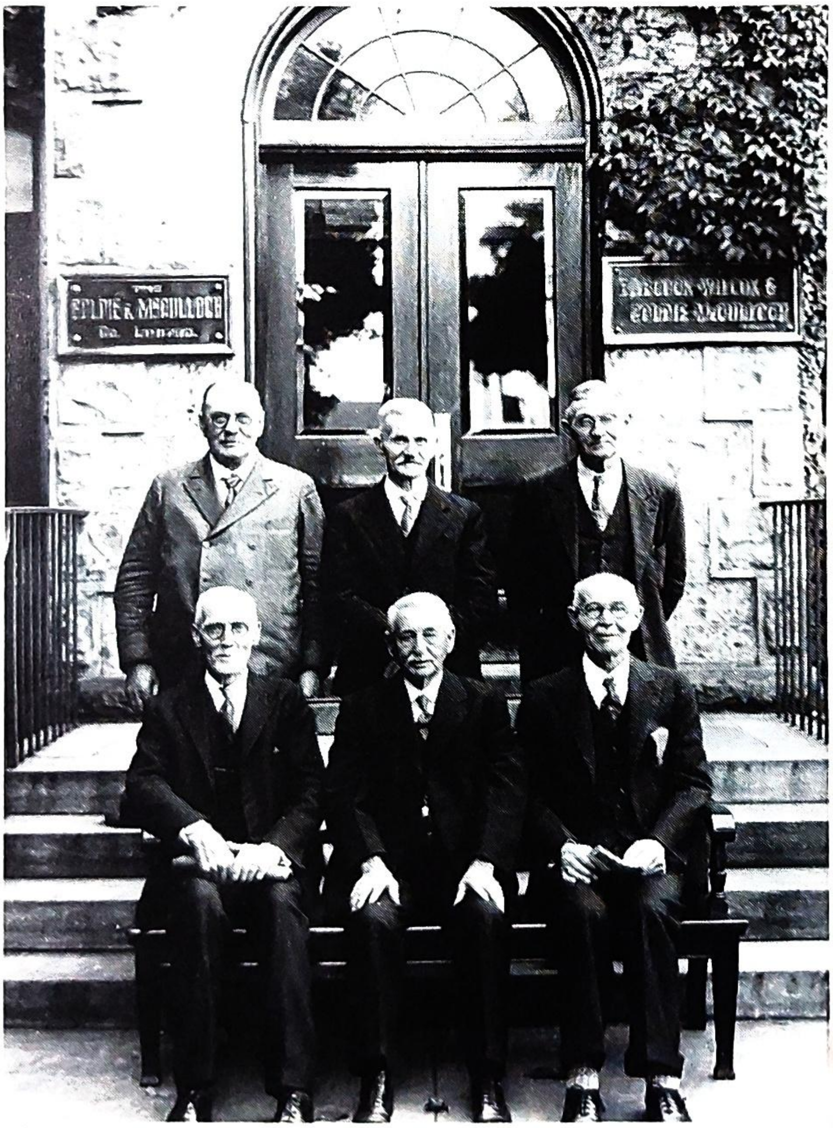
Carl Johns, Shop Supervisor c. 1933-1941.



A portable Goldie & McCulloch V-type 1923 water pump mounted on a "Speed Wagon". The picture was taken in front of the old fire hall on Dickson Street in Galt.

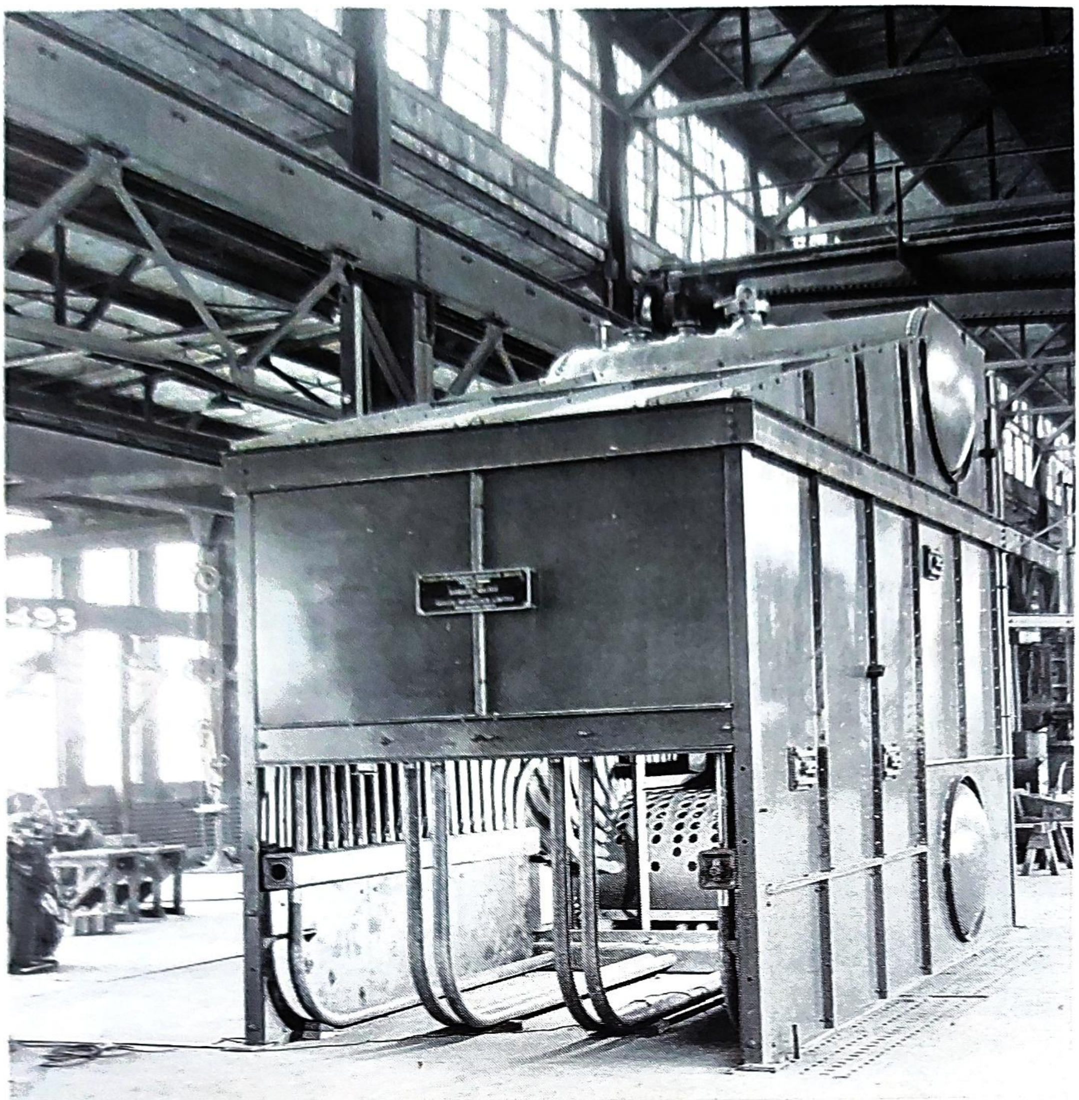


The Company supplied the pumps for the S.S. Fire Tug "Citadelle", pictured here on October 11, 1932. A note on the back of the photo says: "Note, high wind adversely affected the height of the streams".

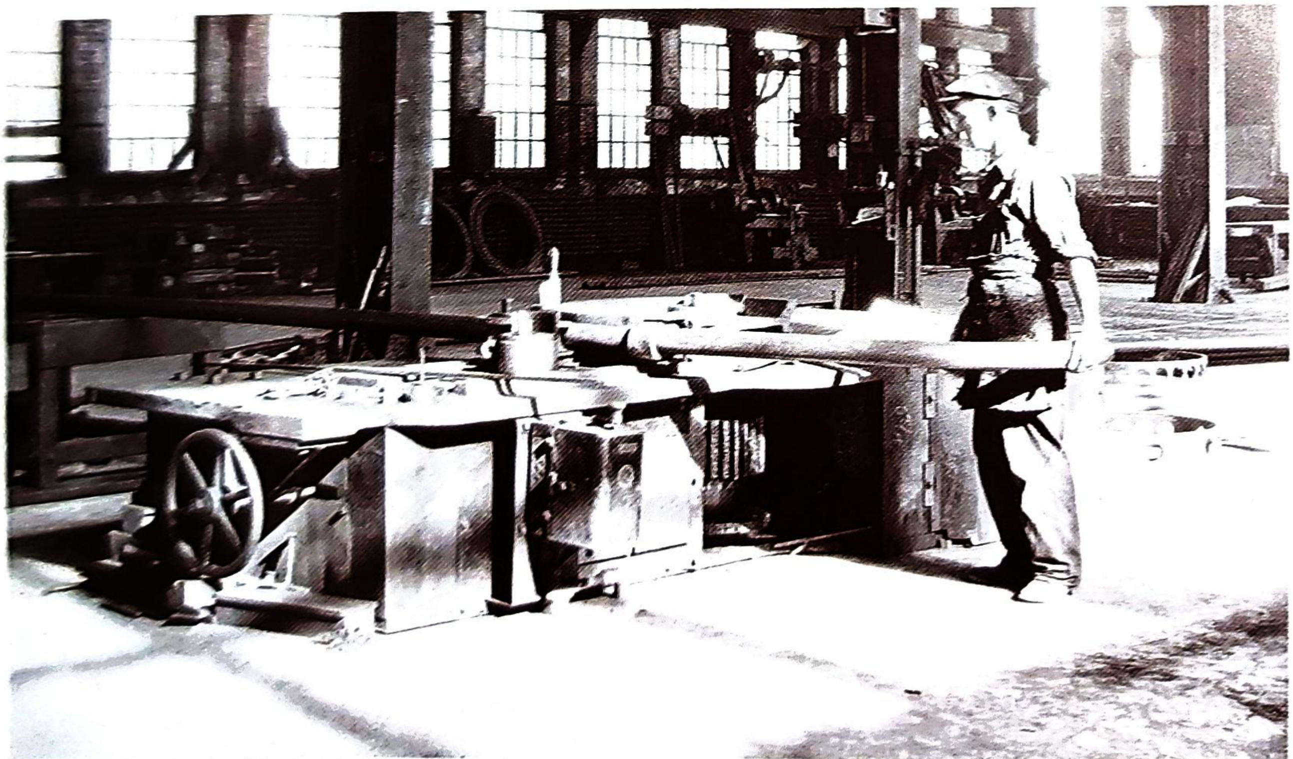

THE GOLDIE & McCULLOCH Co. LIMITED
BABCOCK-WILCOX & GOLDIE-McCULLOCH

Charter members of the Benefit Society on the occasion of the Society's 50th Anniversary in 1933. Seated left to right: Harry Biggs, Robert Hunter, and Frank Johnston. Standing left to right: Charles Brice, Robert Baird, and Robert Mitchell.

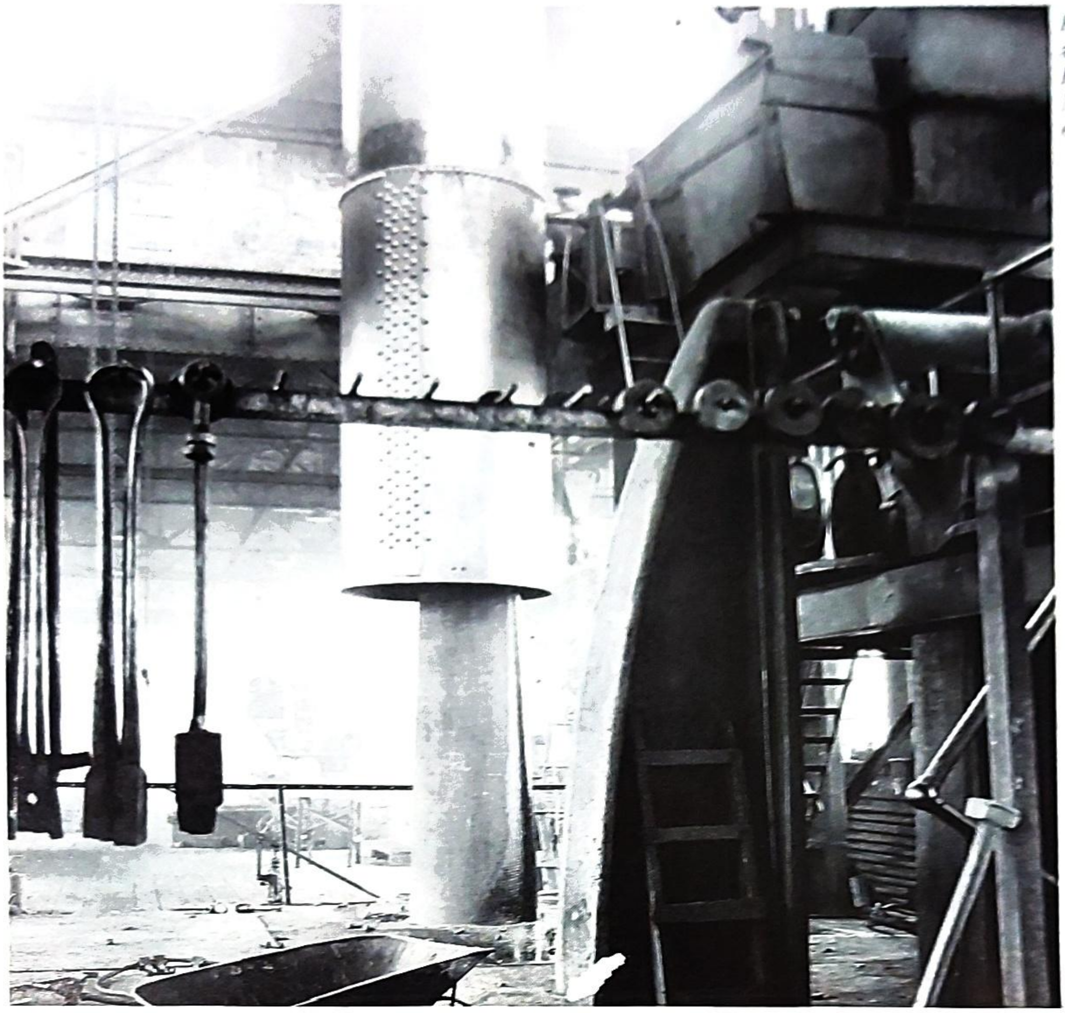
Hugh Leslie McCulloch, President 1935-1951 Chairman of the Board 1951-1966.



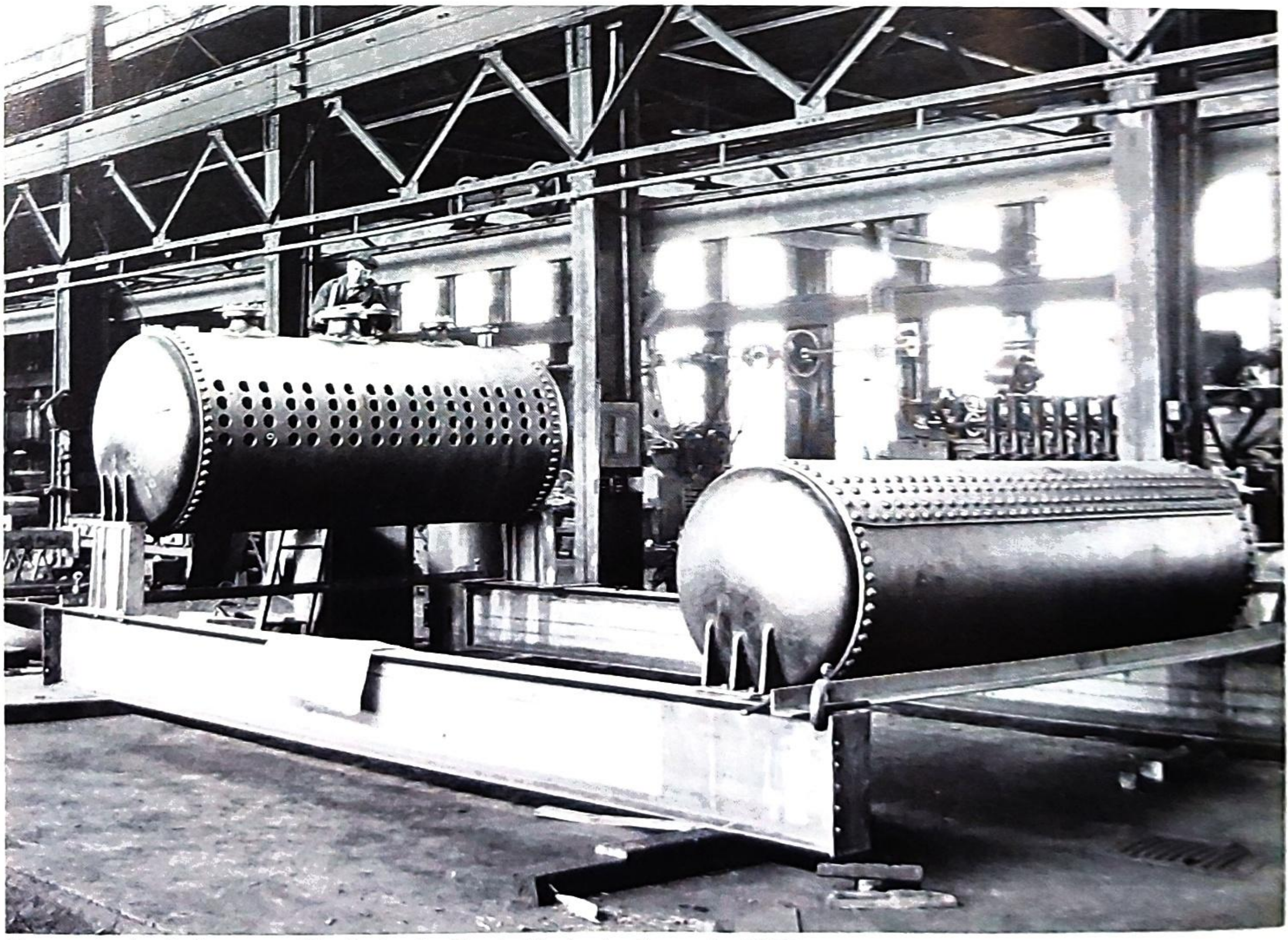
A Type G boiler under construction at the North Works in December, 1938. The 15,000 pounds of steam per hour 160 psi unit (Contract 2585) was for the Hamilton Health Association in Hamilton, Ontario.



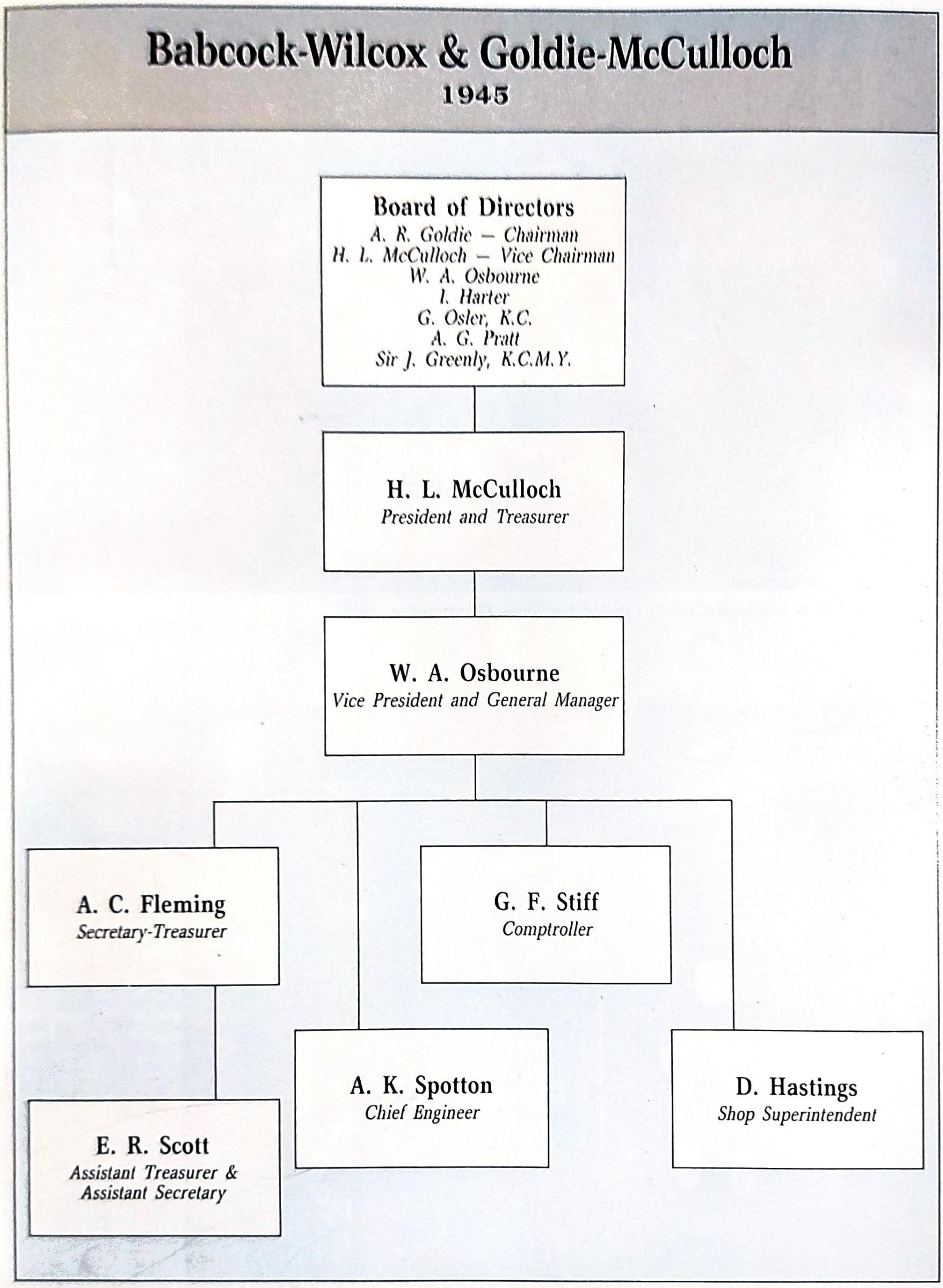
Tube bending in the North Works in the early 1930's.



Rounding and [illegible] a riveted drum in the Roll Tower of the North Works in the early 1930s



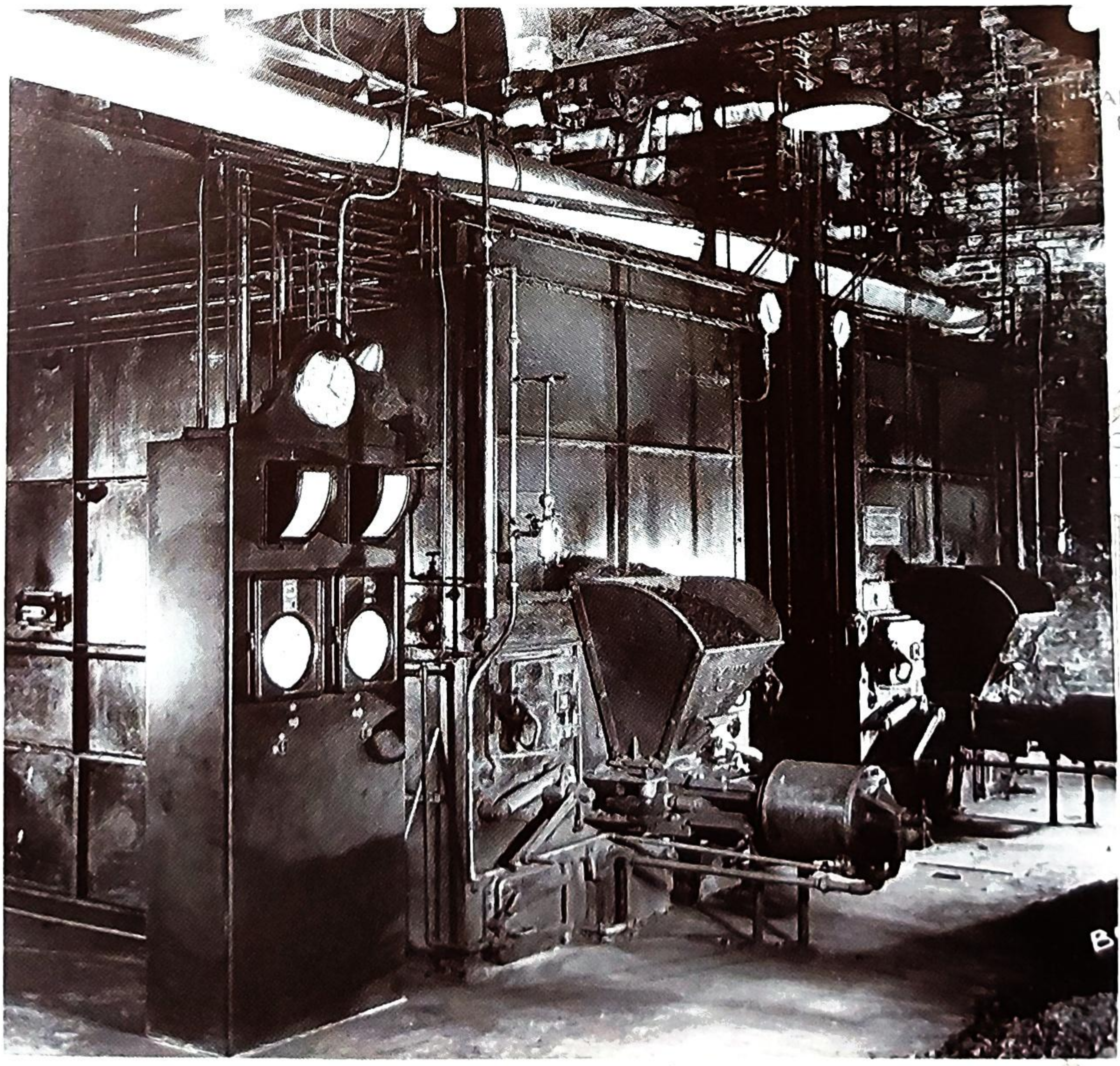
Drums in the boiler assembly jig in the North Works in the early 1930's.



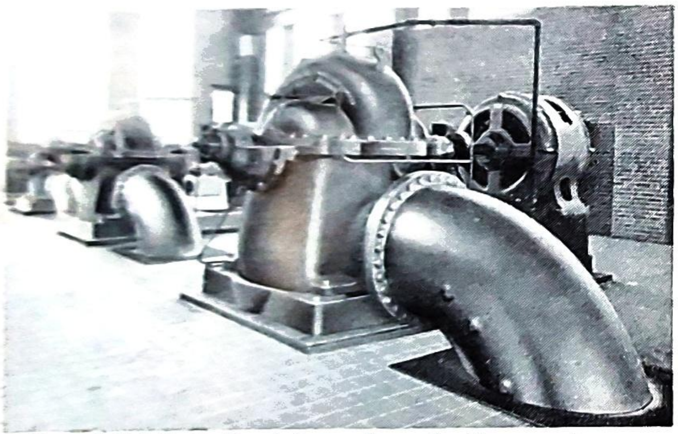
Organization of Babcock-Wilcox & Goldie-McCulloch Limited, 1945.

No organization charts from this period are known to exist. As with earlier charts, this one is compiled from various documents and from educated guesses.

Babcock-Wilcox & Goldie-McCulloch Limited Employee Photograph c. 1948.



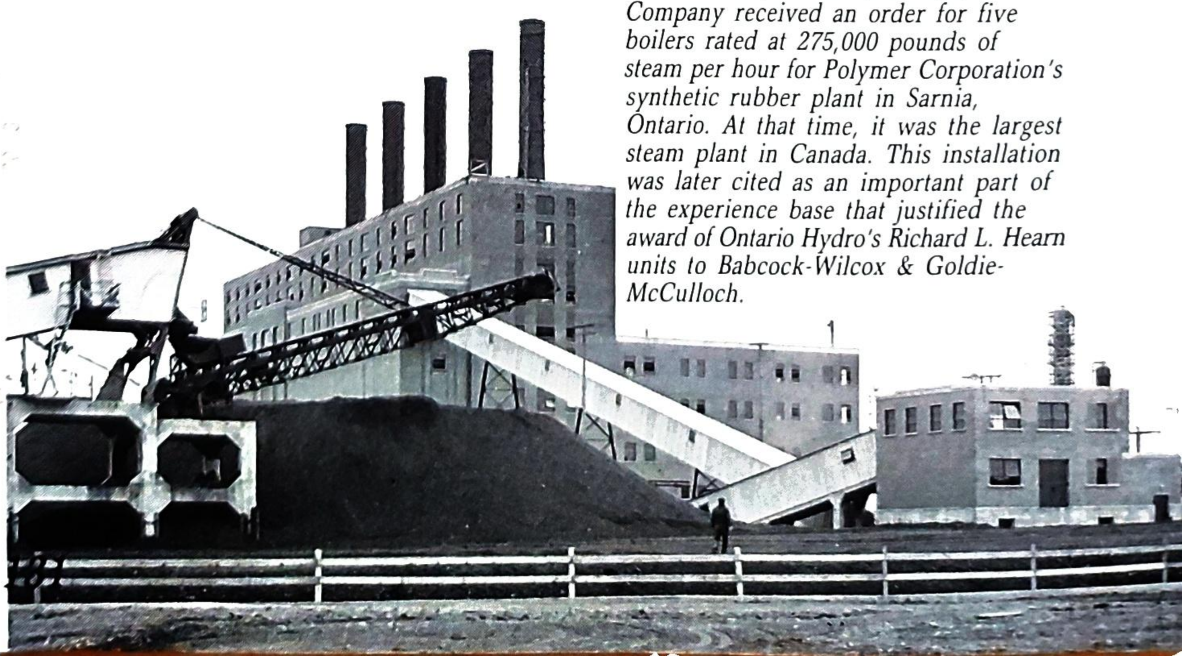
1940 Type 'G' Boiler for Otis-Fensom Elevator Co., Hamilton.

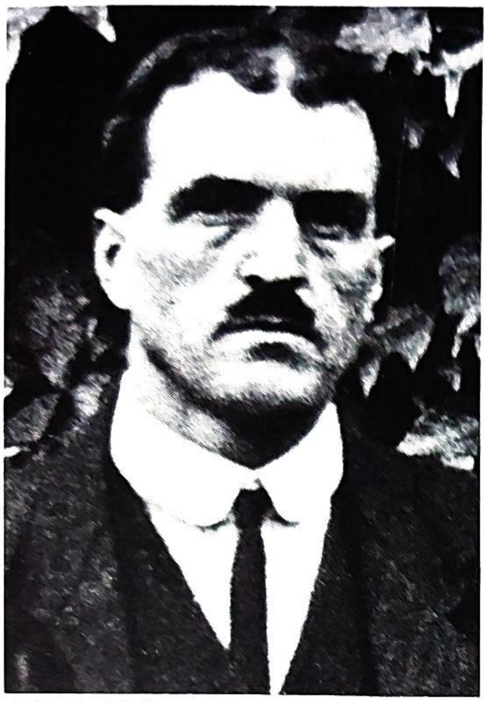


A Type S.V.2 Centrifugal Pump from the Company's Bulletin No. 36-4. Although undated, the bulletin is believed to have been issued in about 1945. The pumps were intended for small capacity and moderate to high head applications, particularly as boiler feed pumps for small boilers. They came in capacities of 35 and 90 gpm and heads of up to 600 feet.

1945 Engineering Society Executive.
Back Row (l to r): Geo. Perrett, Harry Parkinson, William Harrison.
Front Row (l to r): Garnet Dickson, Peter Lecelles, Percy Schupp.

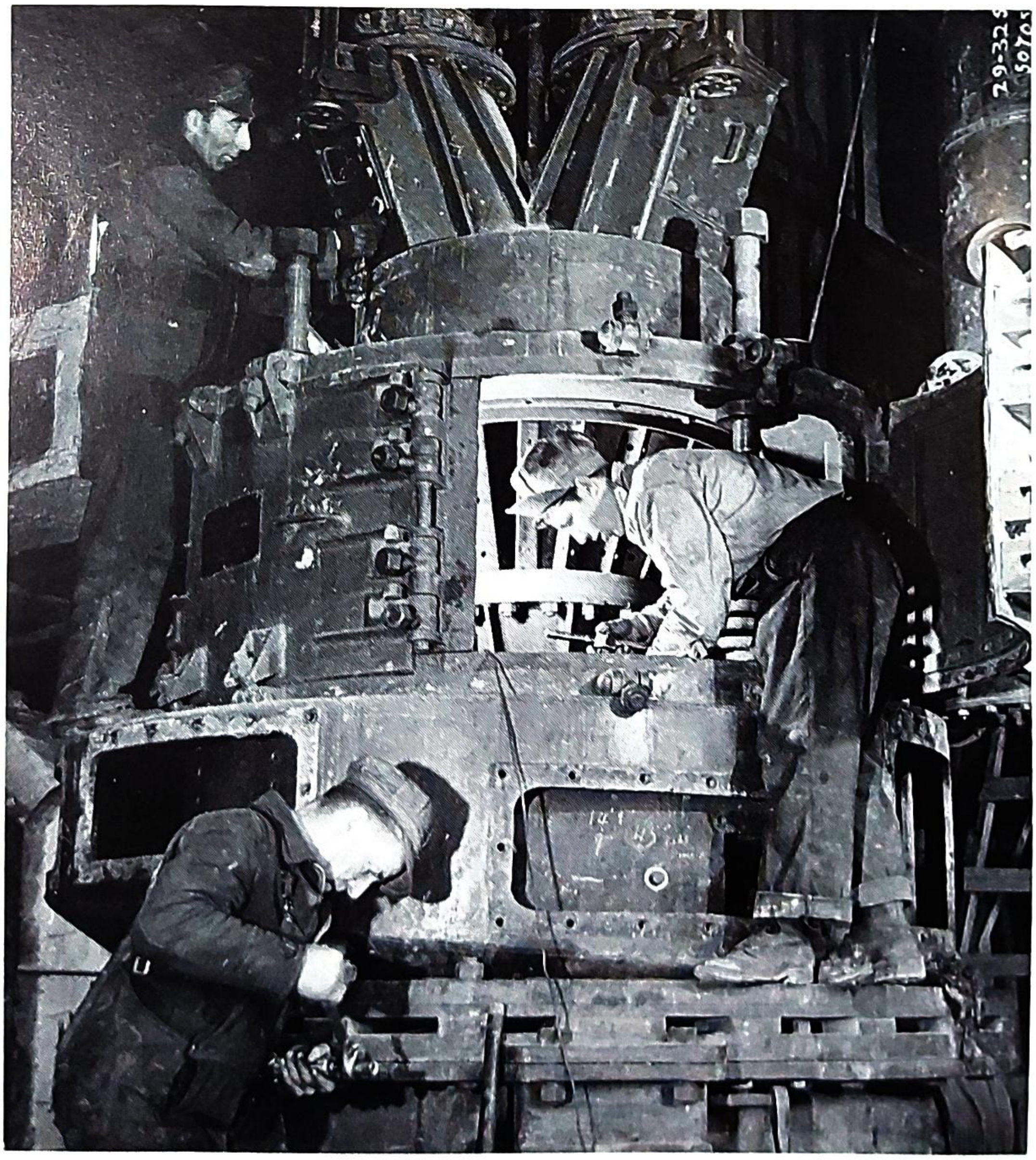
Below: In September of 1942, the Company received an order for five boilers rated at 275,000 pounds of steam per hour for Polymer Corporation's synthetic rubber plant in Sarnia, Ontario. At that time, it was the largest steam plant in Canada. This installation was later cited as an important part of the experience base that justified the award of Ontario Hydro's Richard L. Hearn units to Babcock-Wilcox & Goldie-McCulloch.





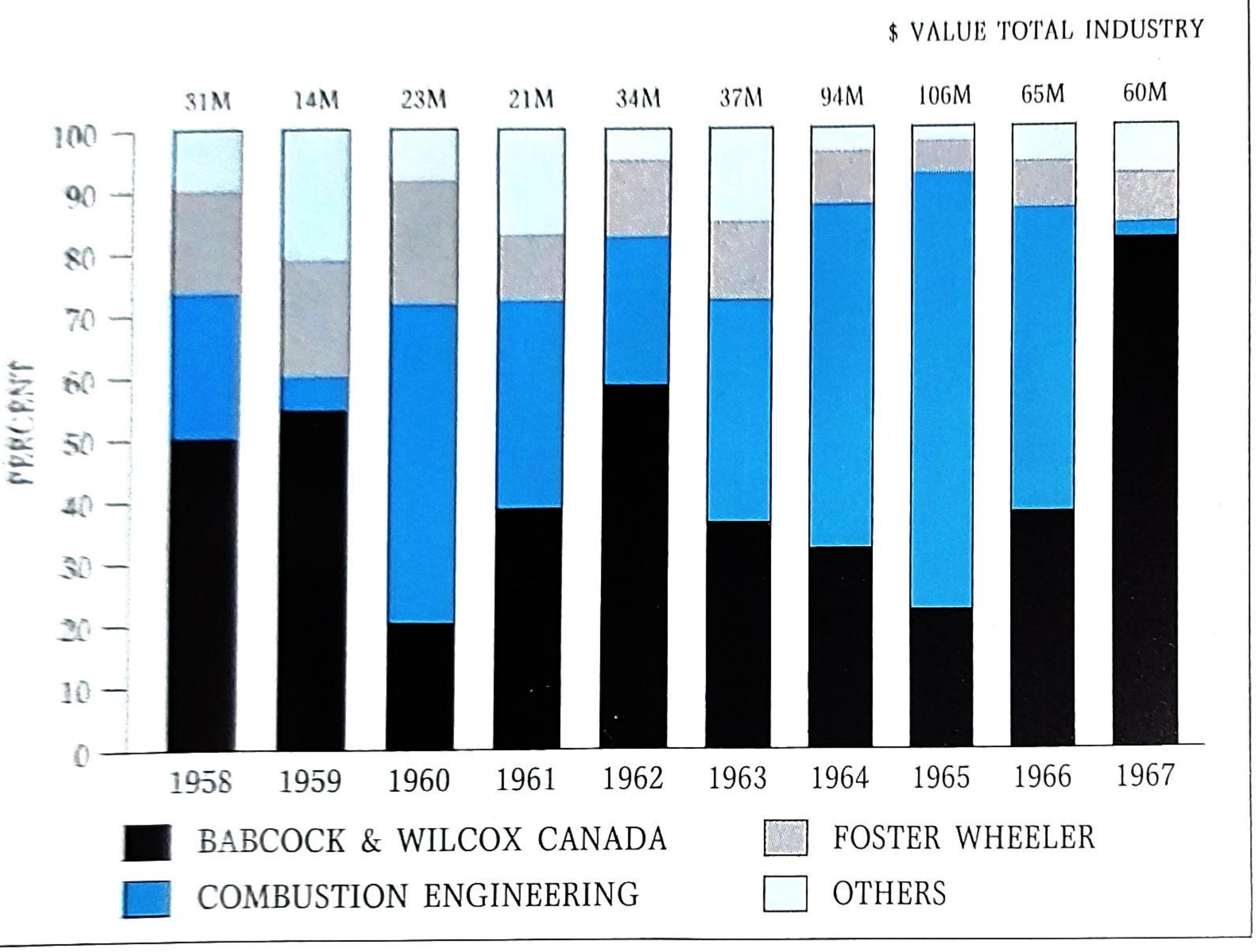
John A. McEwan
Longest Company employee, 61 years.

Lincoln W.H. Ingall
Employed 56 years with the Company.

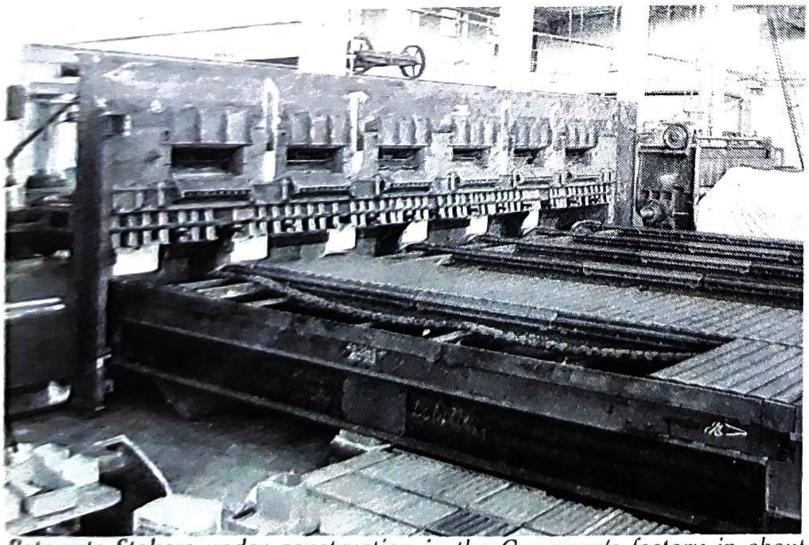


Workers installing one of the ten pulverizers (two per boiler) on the Polymer Corporation's Sarnia plant.

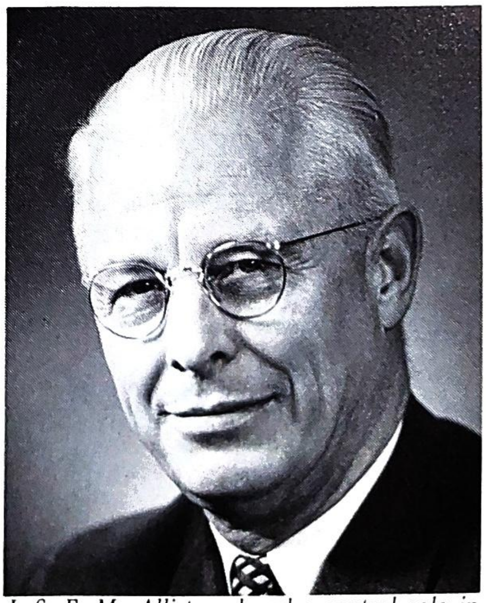
Competitive Standing Water Tube Boilers
1958 - 1967



The reported bookings of B&W Canada, Combustion Engineering, and Foster Wheeler Canada are shown for the period 1958-1967.

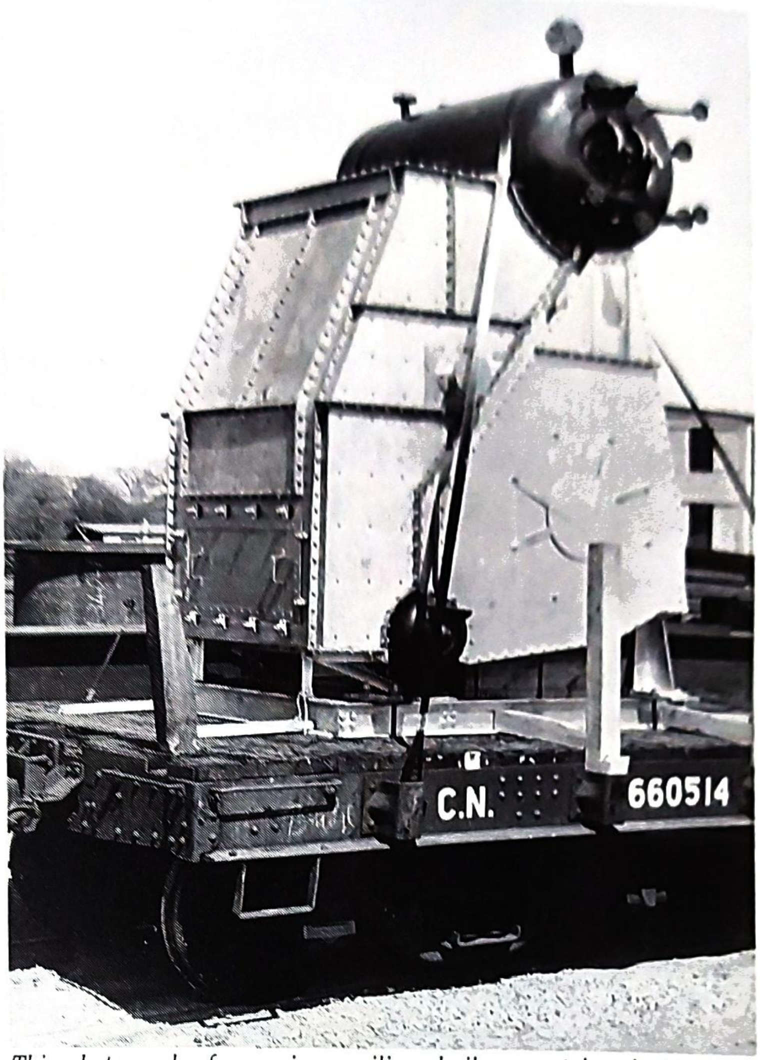


Rotograte Stokers under construction in the Company's factory in about 1948. These stokers were for the Saskatchewan Power Commission's Saskatoon Plant.

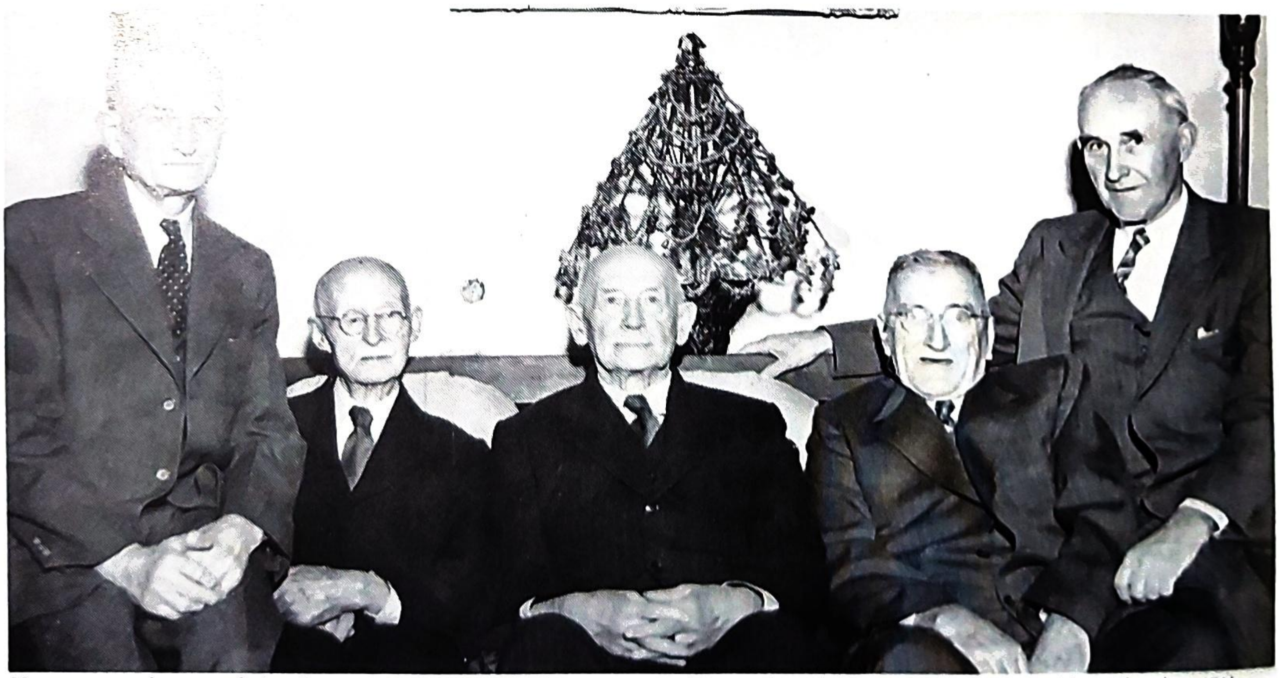


J. S. E. MacAllister played a central role in the Company for many years. He retired from the Company as Vice President-Contracts on May 31, 1967 with thirty-one and a half years of service.

W.A. Osbourne, President of the Babcock-Wilcox & Goldie McCulloch Limited from 1951-1958.

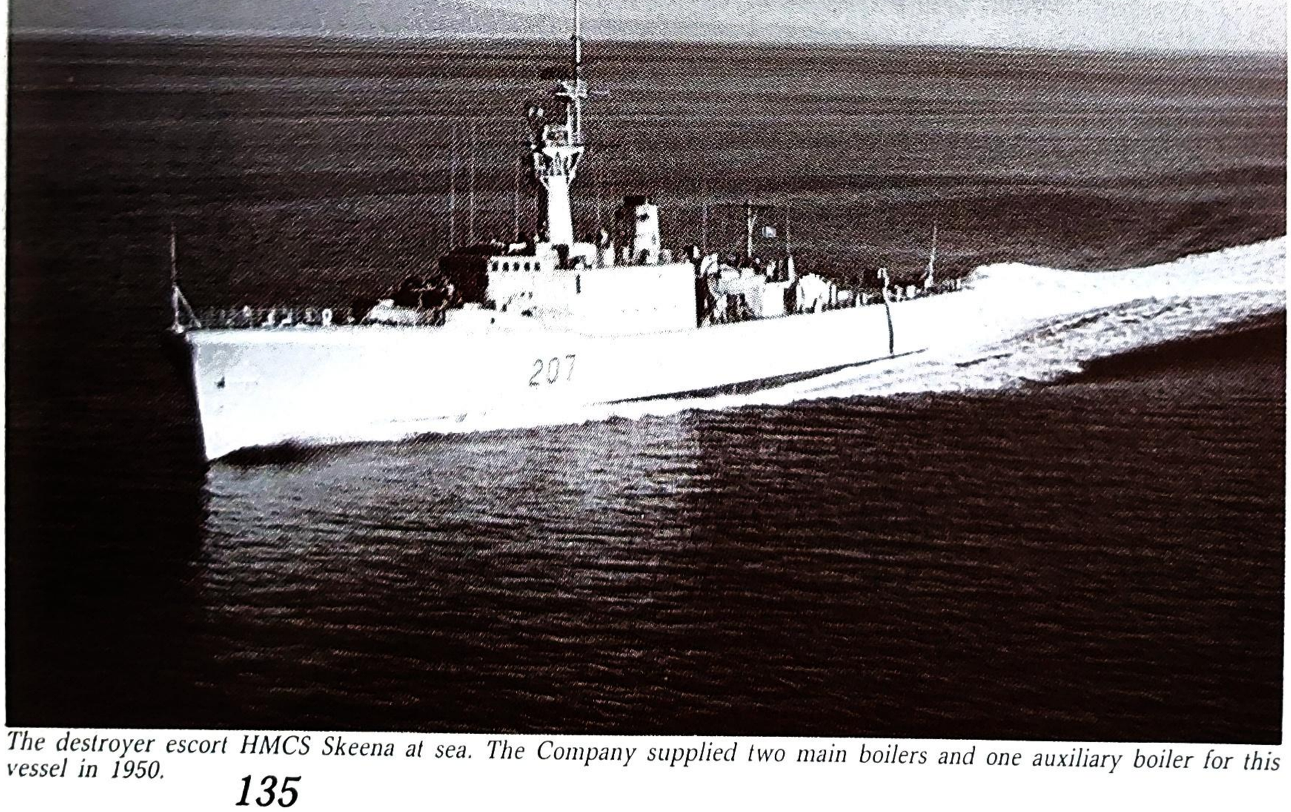


This photograph of a marine auxiliary boiler was taken in May, 1953. The Company supplied seven of these boilers in 1950 and another seven in 1951 for the Canadian Navy's destroyer escort program. During the same period, the Company supplied 26 main boilers to the program.

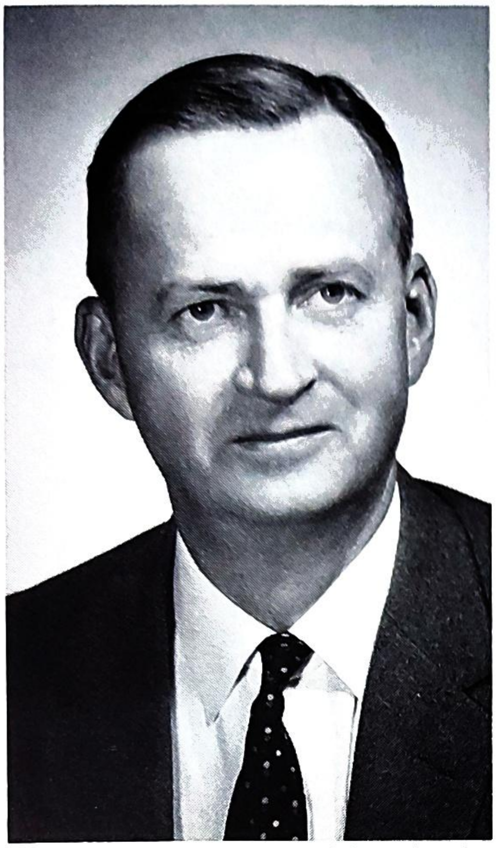


Veteran employees of the Company photographed in 1953. Left to right with years of service: Alex Fleming (51), David Anderson (52), Lincoln Ingall (56), David Hastings (55), and T. A. Elliott.

Officers of the Engineering Society, at the 25th Annual Dinner in 1953. Seated, left to right: H. L. McCulloch, Chairman of the Board of Directors, and W. A. Osbourne, President. Standing, left to right: John R. Jacobs, Vern Johnson, and Roy Youngren, Secretary, Presid and President-elect respectively of the Engineering Society.



The destroyer escort HMCS Skeena at sea. The Company supplied two main boilers and one auxiliary boiler for this vessel in 1950.



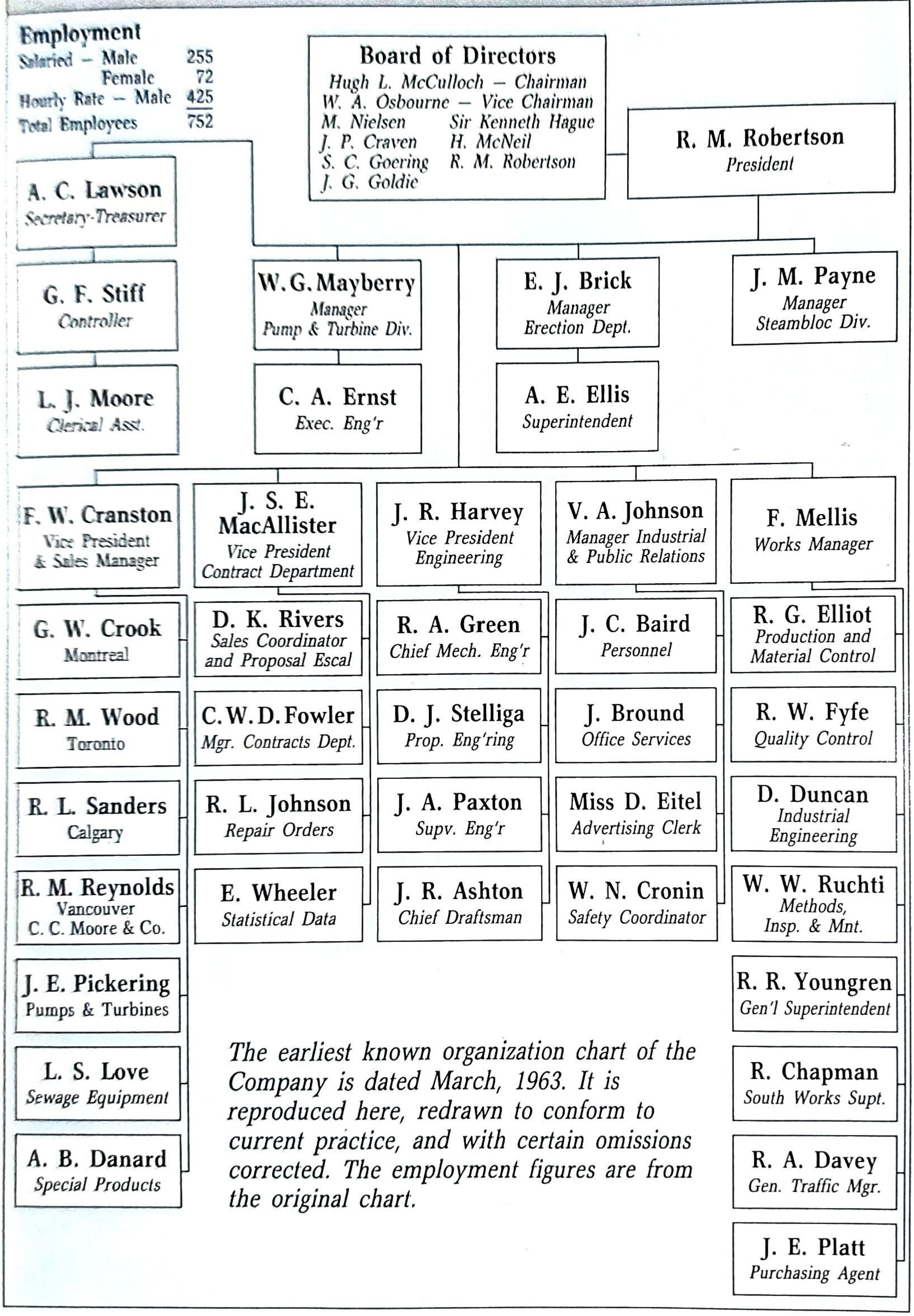
R. M. Robertson, President of the Babcock-Wilcox & Goldie-McCulloch Limited from 1959 - 1967.

Right: Harold Bowman preparing for a pour in the foundry (South Works), c. 1960.

In 1967, the Company's name was changed from Babcock-Wilcox & Goldie-McCulloch Limited to Babcock & Wilcox Canada Ltd.

The Babcock-Wilcox & Goldie-McCulloch Company

MARCH 1963



Employment

Salaried –	Male	255
	Female	72
Hourly Rate –	Male	425
Total Employees		752

Board of Directors
Hugh L. McCulloch – Chairman
W. A. Osbourne – Vice Chairman
M. Nielsen
J. P. Craven
S. C. Goering
J. G. Goldie
Sir Kenneth Hague
H. McNeil
R. M. Robertson

R. M. Robertson
President

A. C. Lawson
Secretary-Treasurer

G. F. Stiff
Controller

L. J. Moore
Clerical Asst.

W. G. Mayberry
Manager
Pump & Turbine Div.

C. A. Ernst
Exec. Eng'r

E. J. Brick
Manager
Erection Dept.

A. E. Ellis
Superintendent

J. M. Payne
Manager
Steambloc Div.

F. W. Cranston
Vice President
& Sales Manager

G. W. Crook
Montreal

R. M. Wood
Toronto

R. L. Sanders
Calgary

R. M. Reynolds
Vancouver
C. C. Moore & Co.

J. E. Pickering
Pumps & Turbines

L. S. Love
Sewage Equipment

A. B. Danard
Special Products

J. S. E. MacAllister
Vice President
Contract Department

D. K. Rivers
Sales Coordinator
and Proposal Escal

C. W. D. Fowler
Mgr. Contracts Dept.

R. L. Johnson
Repair Orders

E. Wheeler
Statistical Data

J. R. Harvey
Vice President
Engineering

R. A. Green
Chief Mech. Eng'r

D. J. Stelliga
Prop. Eng'ring

J. A. Paxton
Supv. Eng'r

J. R. Ashton
Chief Draftsman

V. A. Johnson
Manager Industrial
& Public Relations

J. C. Baird
Personnel

J. Bround
Office Services

Miss D. Eitel
Advertising Clerk

W. N. Cronin
Safety Coordinator

F. Mellis
Works Manager

R. G. Elliot
Production and
Material Control

R. W. Fyfe
Quality Control

D. Duncan
Industrial
Engineering

W. W. Ruchti
Methods,
Insp. & Mnt.

R. R. Youngren
Gen'l Superintendent

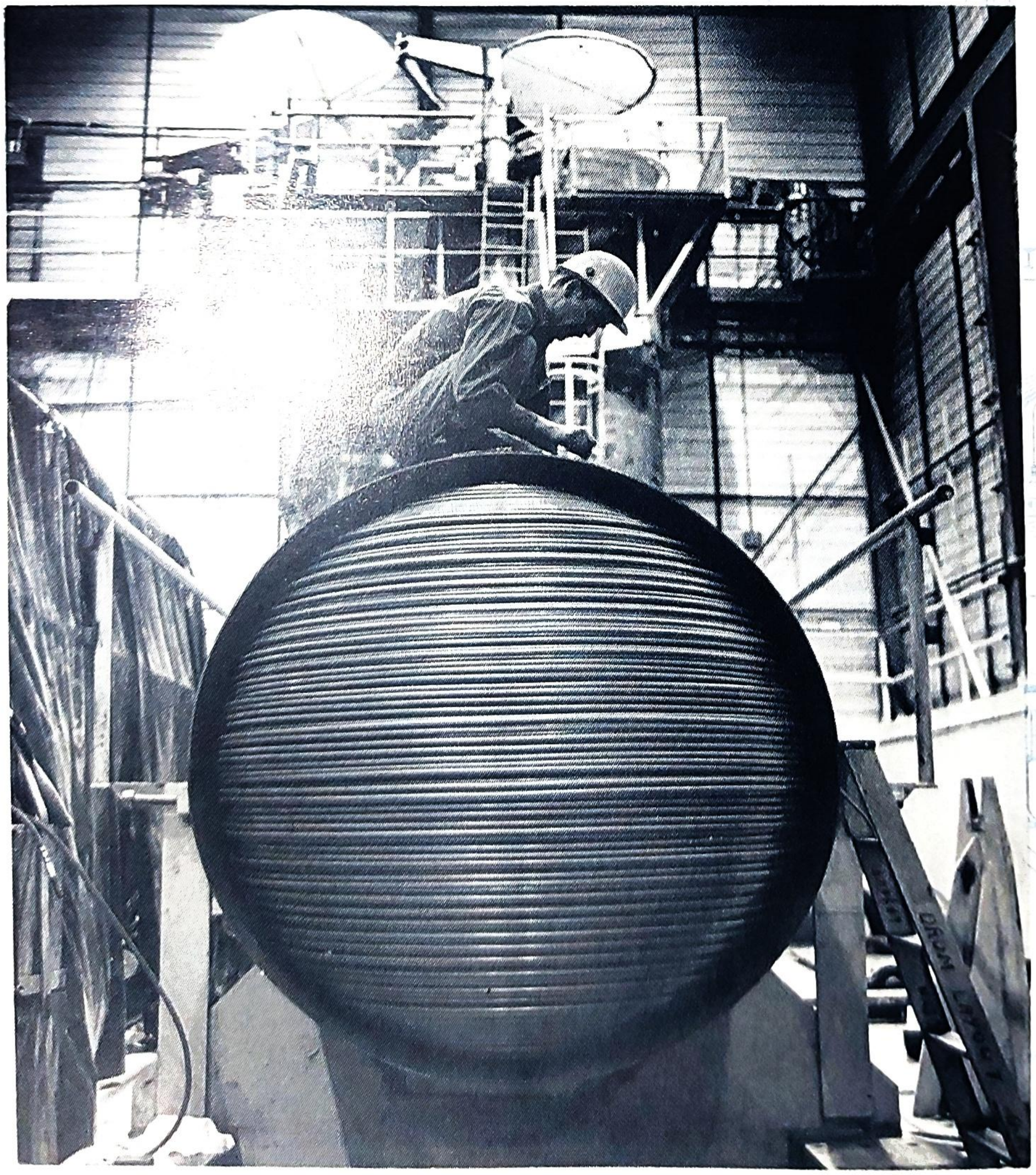
R. Chapman
South Works Supt.

R. A. Davey
Gen. Traffic Mgr.

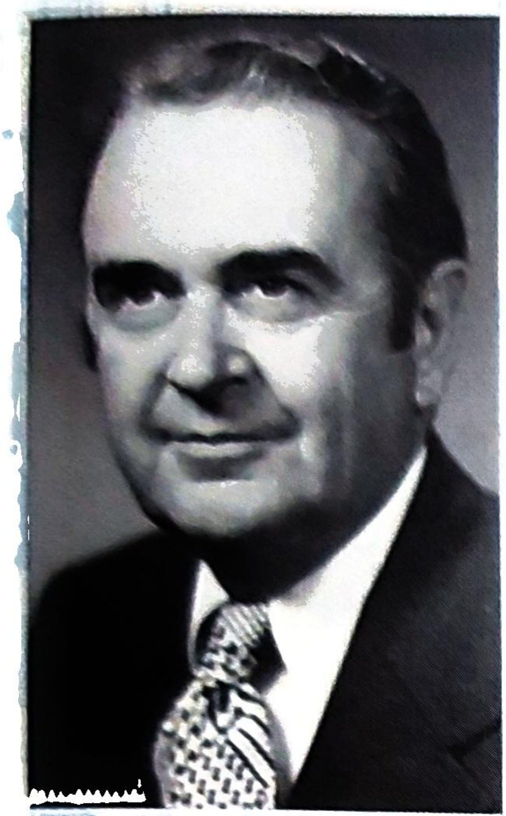
J. E. Platt
Purchasing Agent

The earliest known organization chart of the Company is dated March, 1963. It is reproduced here, redrawn to conform to current practice, and with certain omissions corrected. The employment figures are from the original chart.

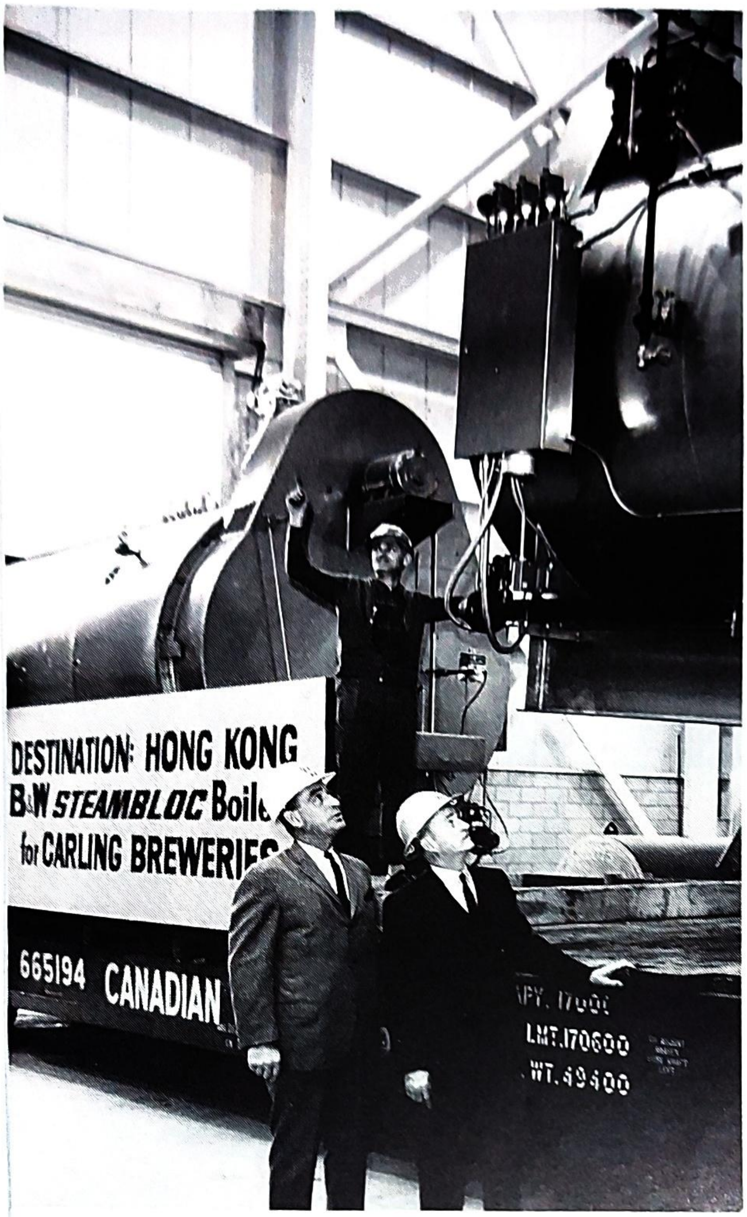
The Lakeview Generating Station being expanded in 1965 for Units 5 and 6. Babcock-Wilcox & Goldie-McCulloch Limited supplied six of the eight boilers to this station, losing two to Combustion Engineering Canada.



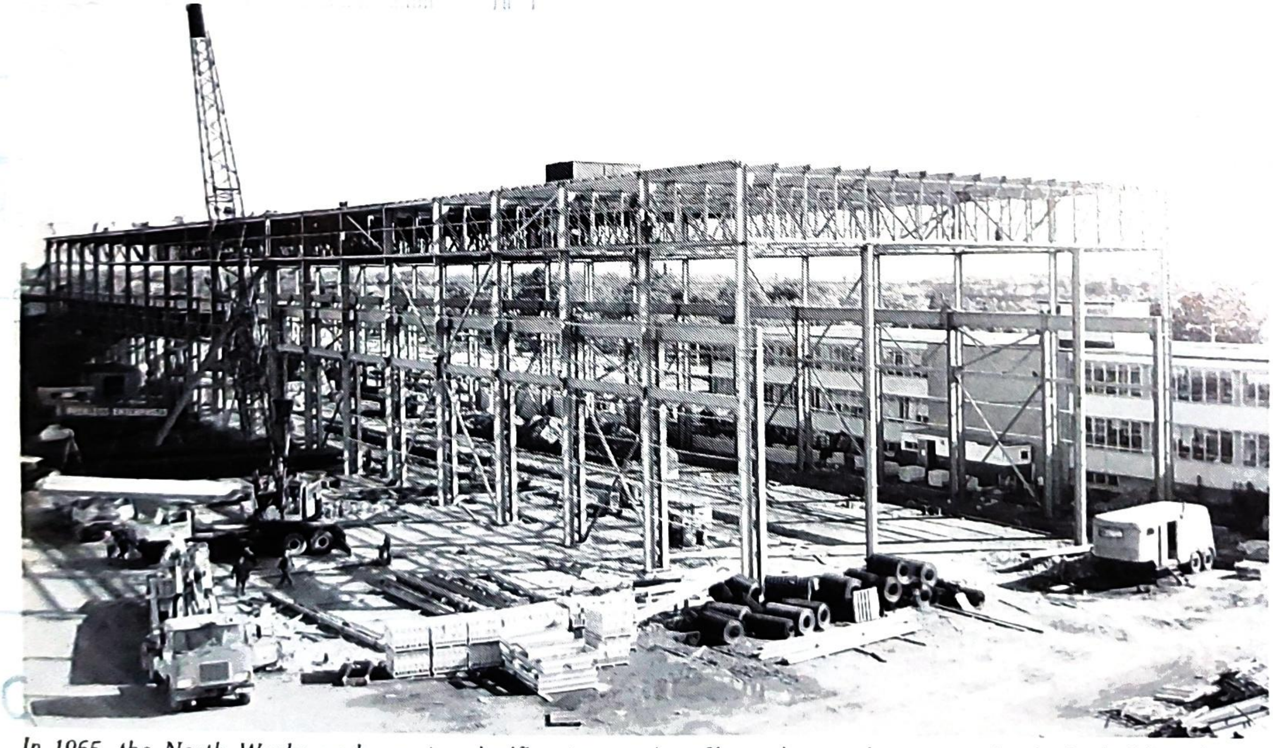
Assembly of one of the heat exchangers for the Karachi, w. Pakistan Nuclear Plant (KANUPP in 1964.



M. Douglas, *President of Babcock & Wilcox Canada Ltd. from 1967 - 1976.*

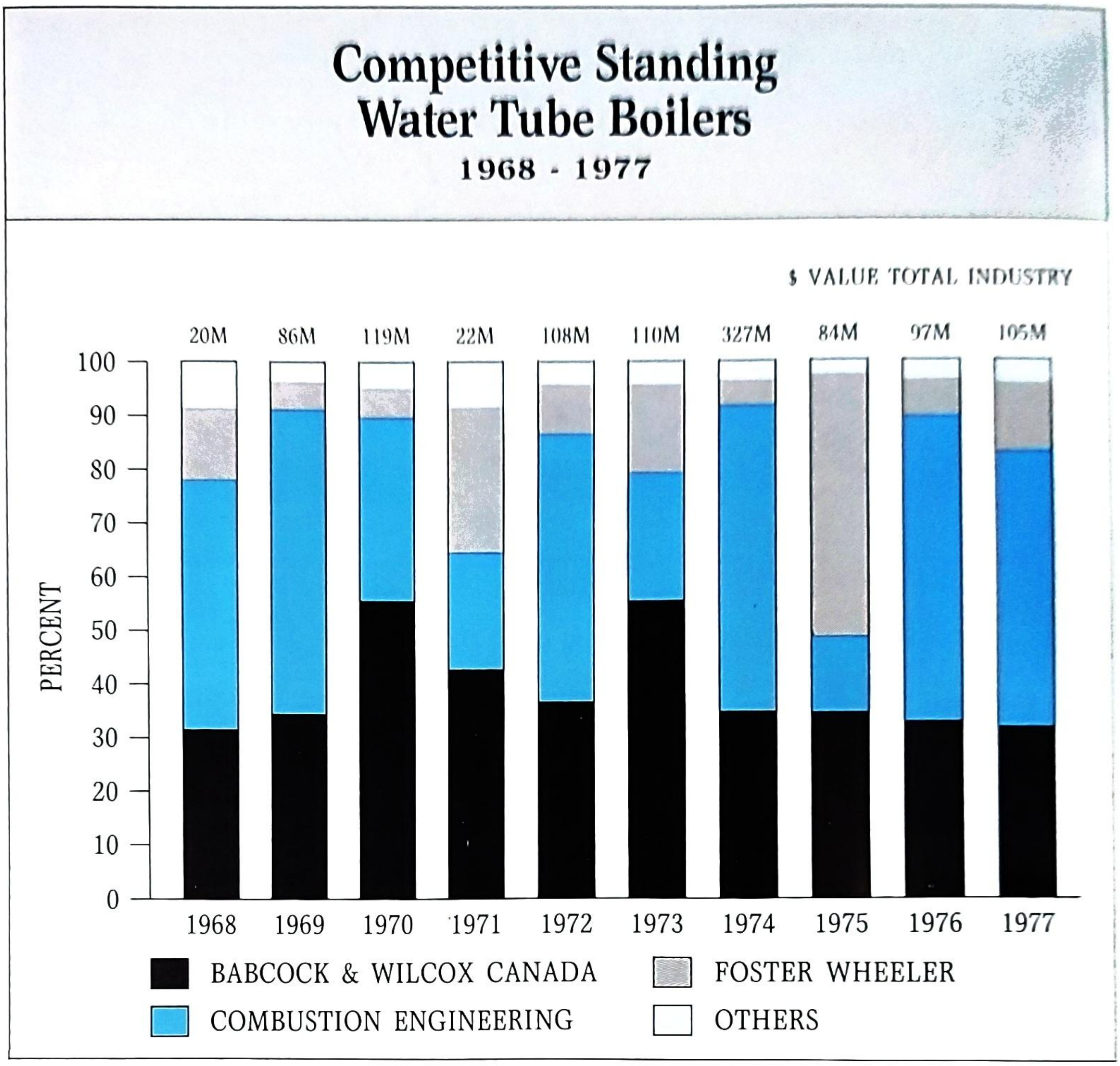


The loading of Steambloc boiler destined for the Carling Breweries in Hong Kong in 1965.

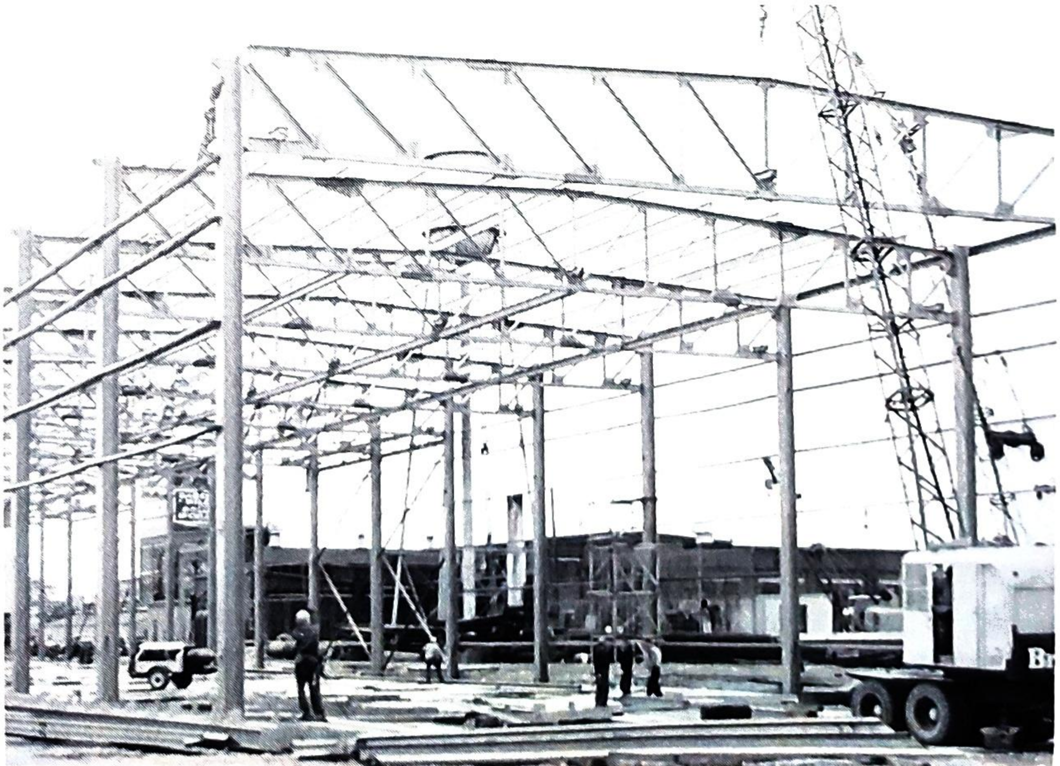


In 1965, the North Works underwent a significant expansion. Shown here under construction is the building that currently houses the boiler shop.

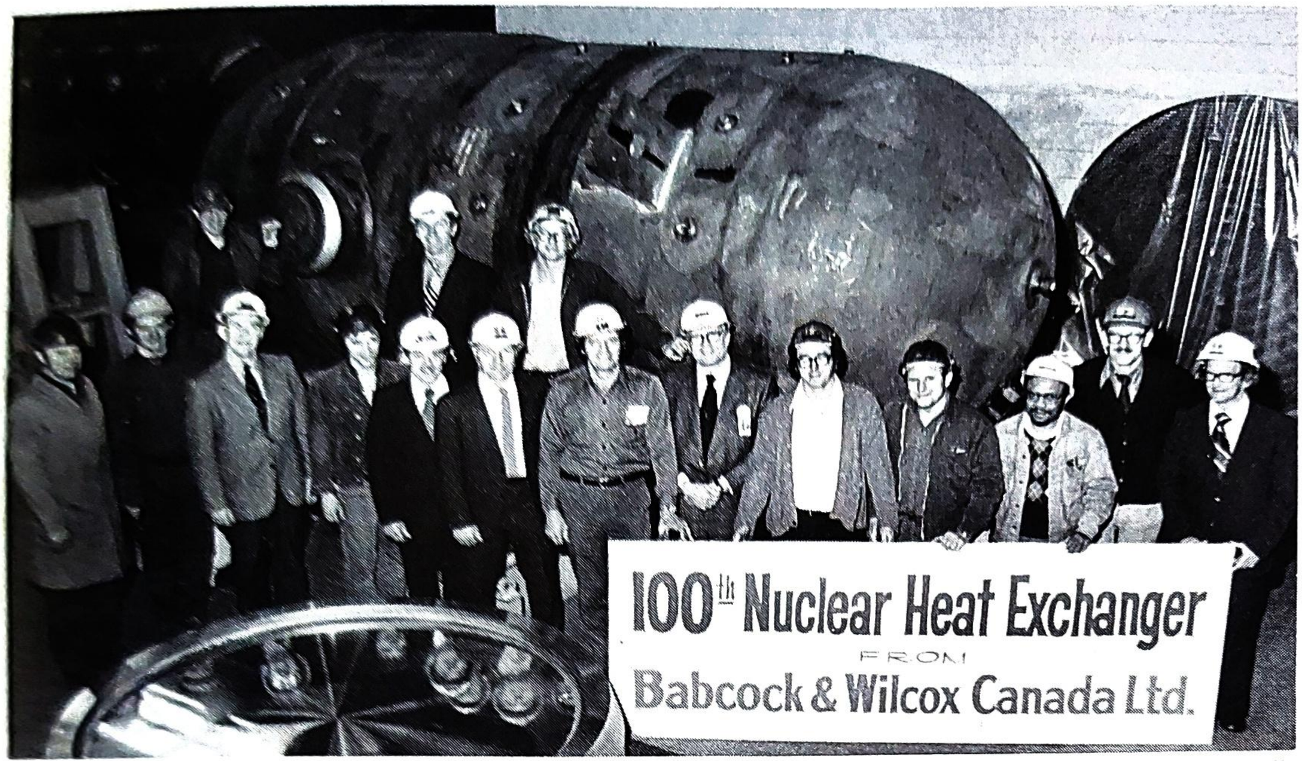
POWER COMPANY



The reported bookings of B&W Canada, Combustion Engineering Canada, and Foster Wheeler Canada are shown for the period 1968-1977.



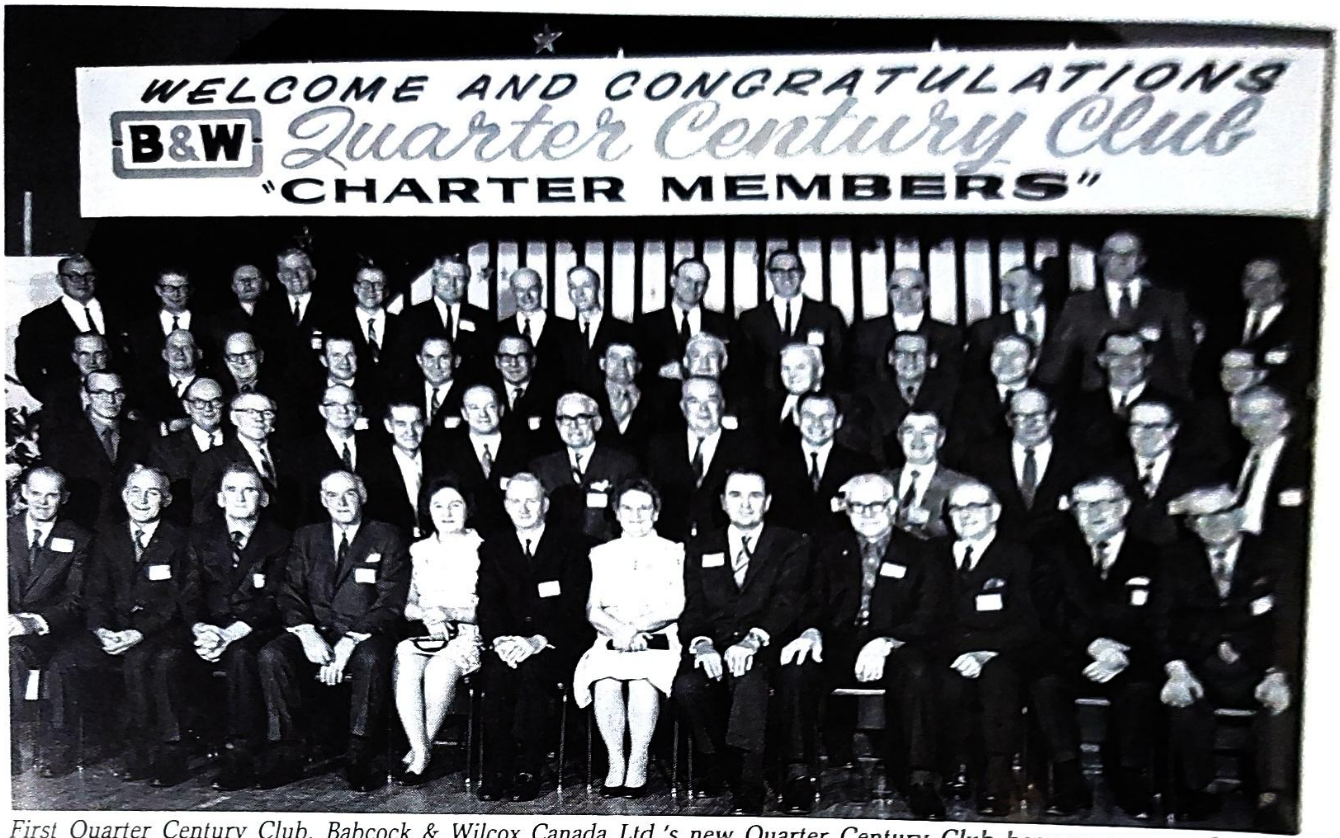
Shop expansions. In 1969 the company began a series of expansions that would continue through the next decade at a cost of ten million dollars.



One hundredth nuclear heat exchanger fabricated in Babcock & Wilcox Canada Ltd. shops. The company eventually supplied 207 nuclear heat exchangers to CANDU plants worldwide, through the 1980s.

Front row (l to r): L. Buschen (Clean Room), J. Mackenzie (Boiler Shop), A. Young (Q.A.), R. Guenard (Clean Room), P. Bergeron (Q.A.), F. Eagle (N.E.D.), H. Cutting (Q.C.), John Dyke (N.E.D.), M. Connolly (Clean Room), J. Sepa (Boiler Shop), D. Glasgow (Q.C.), J. McRae (Clean Room), Don Stelliga (N.E.D.)
Back row: H. Bardsley (Q.C.), B. Schneider (N.E.D.), L. Boughner (Q.C.)

Babcock & Wilcox Canada Ltd. Management Team in the Board Room at the main office (Coronation Boulevard) of the Company, September 1976. Clockwise from extreme left, T. M. Campbell Jr., President; R. J. Sanders, Manager Manufacturing; G. A. Drew, Vice-President, Treasurer and Controller; C. W. D. Fowler, Manager Operation Services; D. J. Stelliga, Manager Commercial Applications; J. R. Harvey, Vice-President Construction; D. T. Stevenson, Secretary; D. J. Kilgour, Manager Engineering; Terry B. Seawright, Manager Business Planning & Analysis; H. E. Robinson, Manager Project Management; Richard M. Wood, Vice-President, Sales and Marketing; Lorraine Sanderson, secretary to Mr. Campbell.

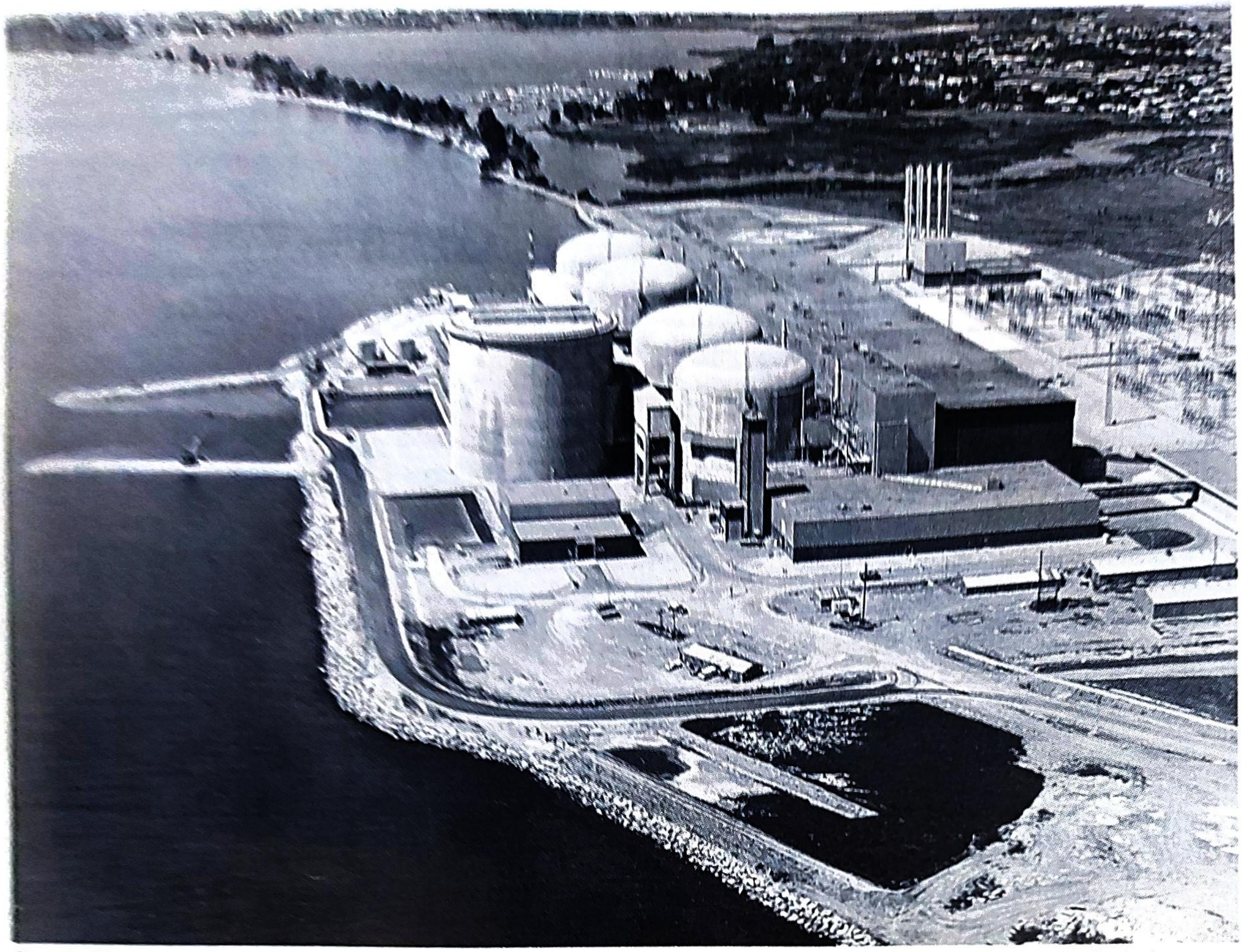


First Quarter Century Club. Babcock & Wilcox Canada Ltd.'s new Quarter Century Club became an annual event following its introduction in 1970.

Front Row (l to r): Edward McNaught, Joe Johnson, Bill Chalk, Fred Cranston, Alice Harrison, R. M. Robertson, Elsie Phillips, J. M. Douglas, (B&W President who presented pins, certificates and membership cards) Harry Pullen, Herb Parkinson, Hubert Zettel, Andy Memmott. Second row: Jerry Voisin, Oscar Pickard, Peter Crupca, Harold Henderson, Tom Hawkshaw, Reid Smith, Maurice Fleury (from Montreal), Fred Mellis, Harold Harman, Bill Harrison, Don Pearce, Tom Lawrence, George Barker. Third row: Cam Grinyer, Bill Purdy, Jack Baird, Jim Hopcraft, Gord Johnson, Les Beechey, Bill Falkner, John Watson, Frank Furlong, Jack Beechey, Willis Spring, Ross Vondrau, Ed. Becket, Top row: Les Taggart, Burt Freer, Ron Wills, Guy Wetherall, Reg. Chard, Ralph Hanna, Fred Purdy, Clare Williams, Bob Slater, Chuck Spurgeon, Bert Ellis, Stan Jewell, Marv MacKenzie, Jack Spurgeon. Not shown: Cecil E. Venables

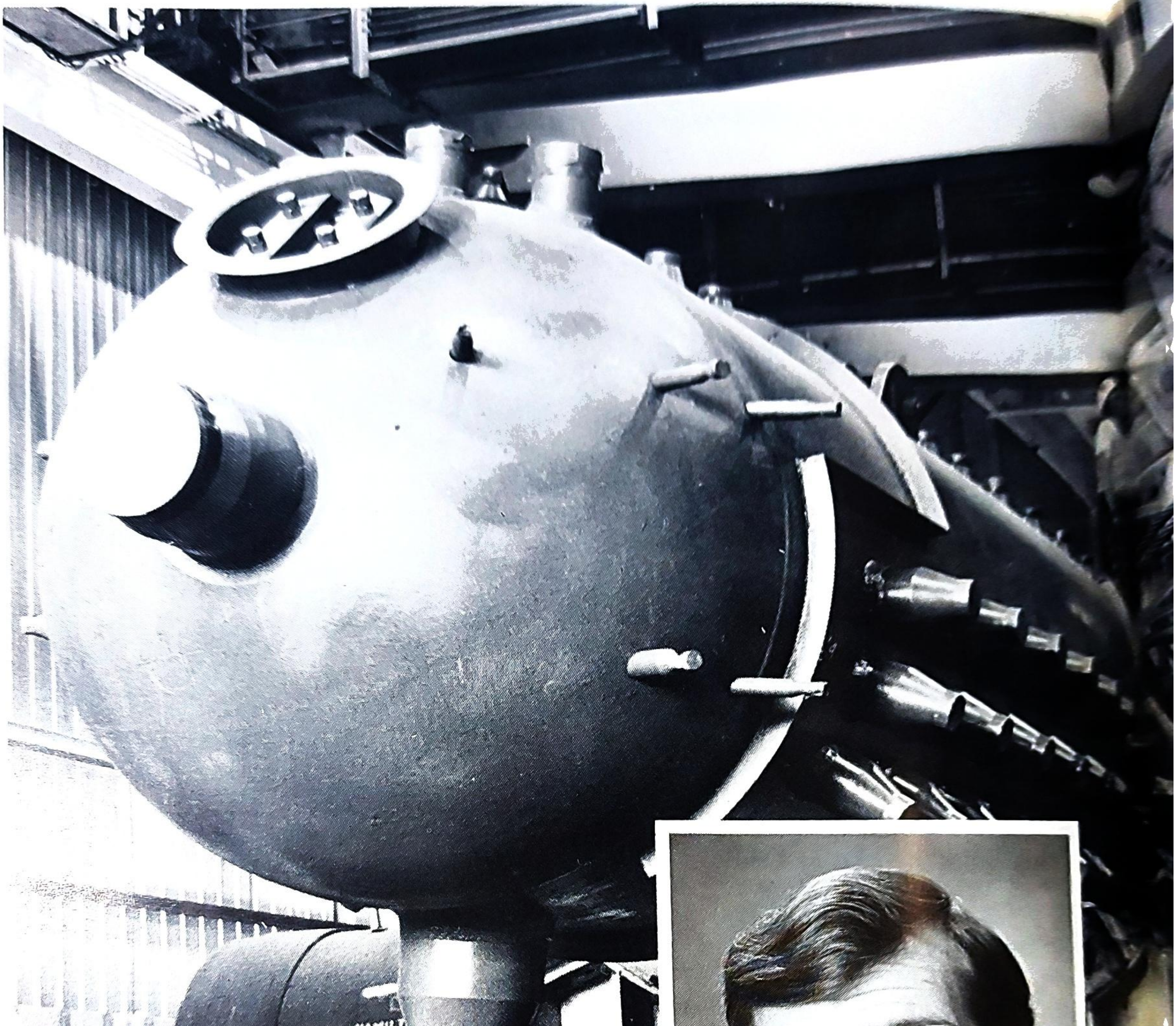
FM package boiler. In 1973, the company booked thirty-tw orders for package boilers in a ten month period.

Dorothy Stevenson, of Service Parts Sales, standing in a casting that was one of the largest ever poured by the Babcock & Wilcox Canada Ltd.'s foundry. The casting was one fourth of a water chamber that the Company fabricated for US Westinghouse c. 1972

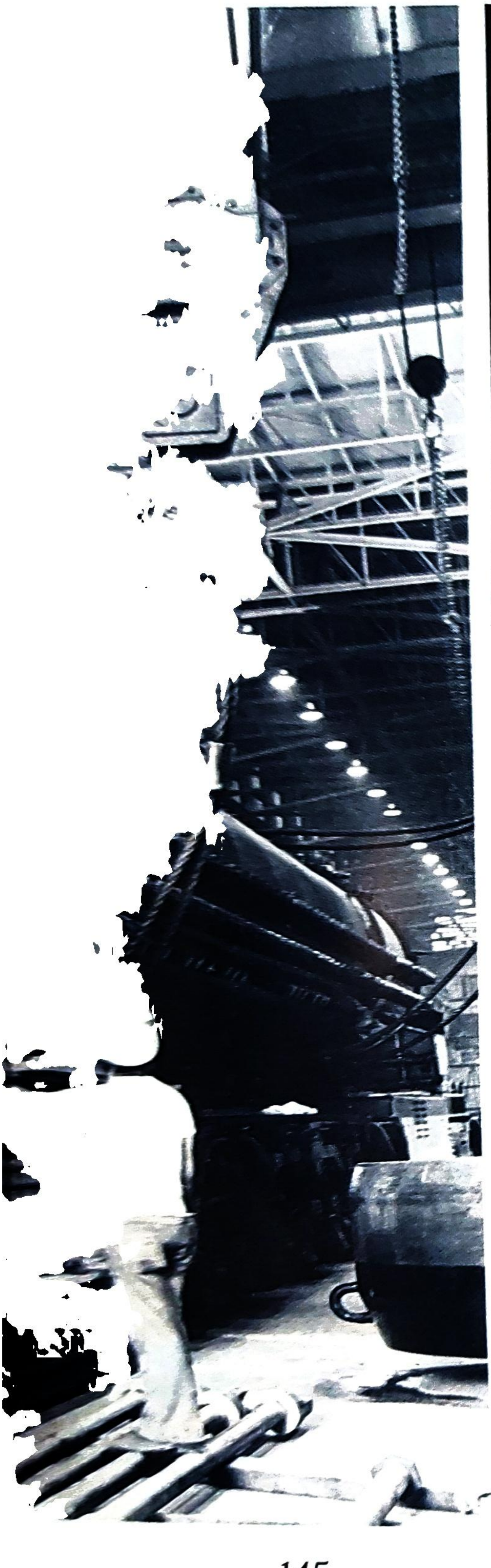


Ontario Hydro's Pickering Nuclear Generating Station as it appeared in 1973. Babcock & Wilcox Canada Ltd. supplied 48 steam generators for Pickering "A" (shown here) and in 1974 contracted for 48 more for the "B" station. Babcock & Wilcox Canada Ltd.'s nuclear steam generators have the best operating record of any steam generators in the world.

Mort Robertson, then Chairman of the Board of Directors of Babcock & Wilcox Canada Ltd., was given a gift in recognition of his upcoming retirement at a Board of Directors meeting in the Company's head office in Galt on March 20, 1970. Seated (l to r): J. M. Douglas, R. M. Robertson, George Zipf. Standing (l to r): Ellis T. Cox, A. C. Lawson, Peter Dunn, W. Brown, R. J. Cantwell.



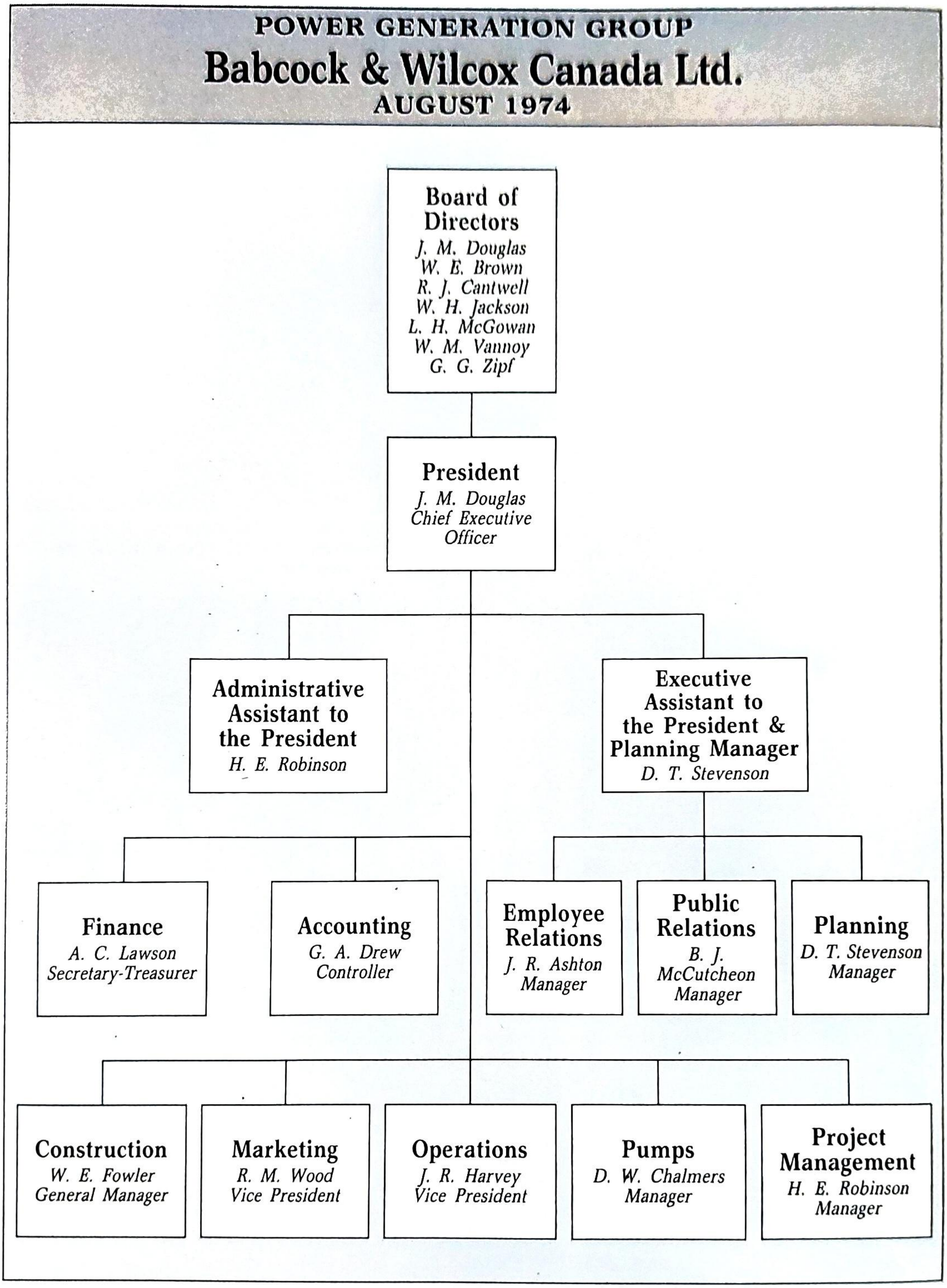
T. M. Campbell, Jr.
President, Babcock & Wilcox Canada
July 1976 to February 1980



Heavy Water Tower construction. In 1976 Babcock & Wilcox Canada Ltd. was heavily involved in construction activity at the Bruce development heavy water plant.

Above: *Babcock & Wilcox Canada Ltd. president J. M. Douglas with Canadian Prime Minister Pierre Trudeau at the 1974 annual conference of the Canadian Nuclear Association. Douglas was elected president of the CNA in 1974.*

Left: *One of the steam drums for Ontario Hydro's Nanticoke Thermal Generating Station in the North Works in 1974. Babcock & Wilcox Canada Ltd. supplied all eight 400MW boilers for this station. Nanticoke is rated at 4,000MW making it the largest coal fired power station in the free world and possibly in the entire world.*



Organization of Babcock & Wilcox Canada Ltd. August 1, 1974.

APPENDIX 1

Founders' Biographies

James Kimball Andrews

(1807 or 1808 - 1861)

James K. Andrews was the son of the first wife of Absalom Shade. In July of 1816, Shade and the Honorable William Dickson (who is credited with having founded the town of Galt), made their way to the vicinity of what is now Cambridge to select a site for the town. They chose a site and tentatively named it Dumfries, after which Shade returned to the United States to bring his wife and stepchildren to Canada.

The wife that Shade brought to Canada was the former Mrs. Andrews of Canadaigue, New York. She had two children by her former marriage, one of which was James K. Andrews. James K. Andrews was later to become one of the two cofounders (along with James Crombie) of the Dumfries Foundry which in turn eventually became Babcock & Wilcox Canada. At the time that Andrews, his sister, and his mother were relocated to Canada by Shade in late 1816 (or possibly early 1817), James was approximately nine years old.

Andrews apparently grew up in Galt (now part of Cambridge) and was employed as a young man in one of Shade's stores. In 1831, Shade turned over many of his businesses to his nephew James Fargis and to his step-son, Andrews. By 1835, Andrews had become a leading merchant in the area. He was the largest purchaser of wheat in the district, he exported flour to Great Britain, and was responsible for establishing several new businesses in the town.

On November 9, 1836, Andrews married Margaret Jackson, of Stavley Mills, Dumfries. Andrews had four children by this marriage: Edward, Catharine, John, and Isabella.

Andrews served in several public capacities to include as Convener of the County Agricultural Society (*The Dumfries Reformer* reported in 1863 that he won prizes for his celery, white beans, and strawberries!), Fire Chief of the first fire company organized in Galt (1843), first station master of the Great Western Railway (1855), and as a major in the First Battalion of Waterloo militia. And, in 1844, he entered into a partnership with James Crombie to establish the Dumfries Foundry.

The following is an account of the founding of the Dumfries Foundry as reported in *Galt: the Gem City of the Grand River Valley* which was published by the Galt Board of Trade in approximately 1920:

Crombie left the Gartshore Works in Dundas to settle in Galt. He made the acquaintance of J. K. Andrews, who was loaded up with a number of projects. A bargain was struck for the foundry, which was located on the spot now filled by Newlands & Co.'s factory. It commenced casting in 1844 under Mr. Crombie and Mr. [Wm.] Scott was among the spectators to witness the start and conclusion of the first job. Mr. Crombie shortly became a busy man and when fairly wealthy was ready to dis-

pose of his foundry business which had been moved to the west side of the river. The next step was the sale of the industry to John Goldie and Hugh McCulloch. So that this particular manufacturing establishment known today as the Babcock-Wilcox and Goldie-McCulloch firm really has its roots in early Galt, for Andrews opened his foundry when the settlement was still a hamlet... The Crombie house [a large and very expensive house at the south end of West Main Street (now Grand Avenue South), since torn down] was built by Andrews but later sold to Crombie. Andrews never lived in it.

The 1851 census for the village of Galt shows the following data for James K. Andrews:

Occupation:	*merchant*
Place of birth:	*United States*
Religion	*Episcopalian*
Age Next Birthday:	*44*
Dwelling:	*Two storey frame*

The following obituary of Mr. Andrews was published in *The Galt Reporter* on November 15, 1861:

DEATH OF J. K. ANDREWS, ESQ.

Death's shafts fly thick among us. One by one our old celebrities are departing and men who transformed the desert into blooming fields, and the forest into smiling meadows and cornfields and built our streets, and made rich with towns and villages our noble country are departing from their labour and looking for their reward.

A few days only have elapsed since "Duke Campbell" was laid in the grave; today we have the same mournful tale to relate of James K. Andrews. Mr. Andrews was for many years an eminent merchant in Galt; and his fair dealing, as well as his admirable knowledge of character, conduced essentially to bring to Galt market the vast produce of this Province from Owen Sound to Goderich, and then to Lake Superior. Every one had his confidence in him; and the poorest settler would send his pig or his load of wheat to Mr. Andrews by his servant or his boy, confident that he would be dealt with as fairly as if he himself had its custody. The character of the town was thereby made; and we are now reaping the advantages which honesty and probity ensure to even the third and fourth generations. In his own position, however, he did not secure the advantages he has left to others. At one time from a sudden and unexpected fall in the price of flour, he suffered severely; at another, from some rash building speculations he was brought very low. But the country gained what he lost, and when it is remembered that he built the Waterloo House in Galt, the forerunner of the noble range of buildings on Main Street, which now confront it, we may safely give him credit as one of the greatest benefactors of the town.

His funeral took place yesterday afternoon...

No likenesses of Andrews are known to have survived.

James Crombie

(1818 - 1876)

What little we know of James Crombie comes mostly from his obituary. That obituary is reproduced below in its entirety as it appeared in the *Galt Reporter* on July 14, 1876:

DEATH OF JAMES CROMBIE

When we say that this community was shocked and startled on Saturday morning last, when the intelligence of the death of Mr. James Crombie reached it, is but feebly to express the feeling which existed. So long a prominent man amongst us, acquainted with all, and with a large circle of intimate friends, his sudden removal seemed to come home to all, and to be deplored by all.

The cause of his death may be very shortly narrated. About 11 o'clock on Friday evening, Mr. Crombie, along with the Manager of the Woolen Works, Mr. Newlands, went to the race — which is close to the houses in which both gentlemen lived — to bathe before retiring for the night. After swimming about in the water for a short time, Mr. Crombie, who was close to Mr. Newlands, said quite quietly to his friend — "I have swum all I can," and was advised to go out. He was then swimming, with only a short distance between the two. Turning to look at him, Mr. Newlands saw him make a few splashing movements in the water and then suddenly go down. Mr. Newlands at once went to his rescue, and dove several times but failed in finding him. Getting out on the bank he gave the alarm at two houses which are very close at hand, and then at once went back to the water, and going to the place where he had last seen Mr. Crombie, he dove down, and succeeded the first dive in finding him. At once he was got to shore and taken to the house. Restoratives were applied and very soon recovery took place, so much so that the deceased freely conversed with his friends; and the medical attendant, Dr. Mulloy, who was quickly present, expressed his opinion that he would soon be none the worse. For some time after this the deceased seemed to progress very well, even getting up and walking about, but, afterwards, while lying down, other symptoms showed themselves. Further medical aid was sent for, Dr. Sylvester, of Galt, arriving very shortly before the deceased breathed his last, and Dr. Swan, of Hespeler, arriving shortly after. Nothing that medical skill could do was of the least avail, and, very quietly, at about half-past four o'clock, Mr. James Crombie breathed his last. Various reasons are assigned for the fatal result of apparently so slight an accident, for the recovery from the immersion in the water was complete; but that to which most credence is attached, is that the shock must have operated upon a weakened heart, causing congestion.

In 1843 Mr. James Crombie removed from Dundas, where he had been working in the foundry of Mr. Gartshore, to Galt, entering into partnership with the late J. K. Andrews, in carrying on a small Foundry just behind the Dumfries Mills. In about two or three years they removed *to new premises on the site where Goldie & McCulloch's extensive works now stand, carrying on business successfully there for several years. Financial embarrassment caused Mr. Andrews to retire, and the business passed wholly into the hands of Mr. Crombie. From this time success crowned every effort he made for years, and after a time, disposing of his Foundry business to Messrs. Goldie & McCulloch, Mr. Crombie retired, confining his operations to pushing the various other business, in which, while in the Foundry, he had become interested. One after another the large flouring mills at Baden, Stratford, Clinton and Seaforth fell into his hands and were operated by him, and it was while engaged in these operations that much of the way was paved for future losses. At this time Mr. Crombie was probably the representative business man in Western Ontario and shortly after the establishment of the Royal Canadian Bank he was elected one of the Board of Directors. 1872-3-4 saw severe reverses to him in the grain market. In an evil day he entered with some unfortunate others in the Chicago grain market, and had the usual experience, viz: temporary gains and ultimate huge losses. These losses finally swept away the large fortune he had possessed, leaving him almost bankrupt. In 1870 he took hold of the large woolen factory at Preston, which he fitted up in the most modern style, and with all the latest machinery. Thus he carried on until about a year and a half ago, when with his other property, it passed into the hands of his creditors. By an arrangement this Factory was bought by a friend from his creditors, and Mr. Crombie instated as Manager, and with very good prospects of once again becoming its owner, when his lamentable death occurred.*

At different times Mr. Crombie occupied a seat at the Council Board in Galt, and in 1867 he contested South Waterloo, in the Sandfield McDonald interest, against Mr. Isaac Clemens, being then defeated.

The funeral took place on Monday afternoon, at 3 o'clock, from Preston to Trinity Church Cemetery, Galt. All the places of business were closed in both Preston and Galt during the time the funeral cortege was passing through.

In addition to the above obituary, an entry for James Crombie (with his name misspelled) appears in the *Census for Upper Canada, 1851 — Village of Galt:*

NAME	OCCUPATION	PLACE OF BIRTH	RELIGION	AGE
Crumby, James	Founder	Scotland	Presbyterian	33
Crumby, Barbara		Scotland	Presbyterian	31
Crumby, Maryanne		U.C.	Presbyterian	10
Crumby, Isabella		U.C.	Presbyterian	7
Crumby, Elizabeth		U.C.	Presbyterian	3

The census also notes that "Mr. Crumby" lived in a 1½ storey single family frame house.

In addition to serving on the Board of Directors of the Royal Canadian Bank and having accepted a seat on the Village of Galt Council, Crombie is also known to have served some time during the 1850's as a captain in the First Battalion of Waterloo Militia in which he was the Commander of First Company.

Crombie also appears to have been something of an amateur gardener, and *Dumfries Reformer* article of October 9, 1861 reports that Crombie won prizes in a local horticultural exhibit for his tomatoes, table squash, white garden turnips, early horn carrots, white cabbage, savoys, and celery.

No likenesses of Crombie are known to have survived.

John Goldie

(1822 - 1896)

The following biography of John Goldie is from the records of the Waterloo Historical Society:

JOHN GOLDIE, JR.

John, the second son of John and Margaret Goldie, was born, in 1822, near the west coast of Scotland, on the Doon, a small river which falls into the Firth of Clyde, two miles south of the seaport of Ayr. He was sent to school in Kilroy, a village near his home, but for only a short time. The school seems to have left some impress however. He had a keen mind, and his love of sound reading, which he came by naturally and from home, gave him in time a wide range of information.

There is to be said of Scotch country schools that they are remarkably thorough. Robert Burns, beloved of all Scotchmen, born within a few miles of John Goldie's birthplace, received all his formal education in an Ayrshire village school.

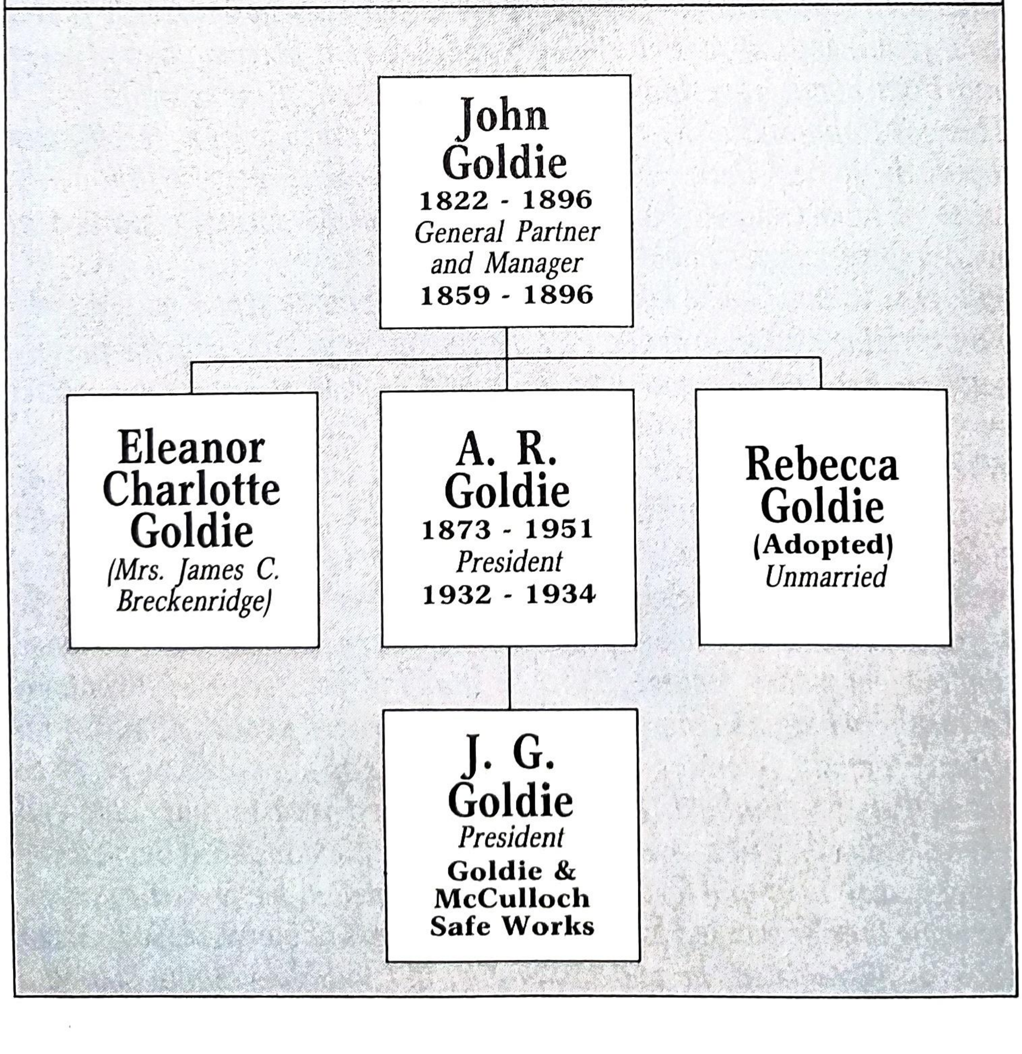
Still quite young, Goldie left school and was apprenticed to James McNab, a millwright, with shop at Old Poll. During his apprenticeship the railway between Ayr and Glasgow was built, and McNab secured the contract for the cars in the construction of which Goldie assisted.

When he was twenty-two John left McNab to emigrate with his family to America, to where his brothers William, the oldest, and James, later of Guelph, had preceded. The family came direct to Greenfield, so named by the father, a farmstead near Ayr, contracted for purchase from the original Dumfries Township proprietor, William Dickson. John obtained employment under George Baird, a building contractor of Blandford Township, where he remained for a year. Later he went to Montreal for eighteen months, working as pattern maker. For a number of years he was active at Greenfield. He had a small shop with turning lathe and other machinery, had a saw-mill with a neighbor and installed the machinery in a small flour-mill for his father, all as related in the preceding paper. For some time he worked as mill-wright for James Crombie in Galt. About 1855, as also related, he and his brother-in-law Sidney Smith started a *sawmill near Acton, in Esquesing Township, and carried on this business for three or four years.*

In 1859 came his first large opportunity in business, and the beginning of what may be called his life work. The Dumfries Foundry in Galt, the iron-working industry of his former employer James Crombie, was for sale. Goldie and his friend Hugh McCulloch, forming a partnership, bought this business, on easy terms of payment. From a small shop employing twenty-two men in 1859, when they bought it, the plant grew rapidly. The first large contract of the partners was for the machinery of the rolling-mill for the Great Western Railway at Hamilton. This was satisfactorily accomplished; and gave the business a great impetus. From the beginning the aim was to produce only the best work of its kind. The plant soon grew to large proportions. Hardly a year passed without some addition to buildings or the starting of a new line of manufacture.

In 1891 the partnership was turned into a joint stock company with Dominion Charter and Capital Stock of $700,000; the original shareholders being John Goldie, Hugh McCulloch, David Goldie, Hugh McCulloch Jr., and

The Goldie Family
PARTIAL FAMILY TREE



R. O. McCulloch. Today the business is one of the largest, if not the largest, of its kind in Canada. During the Great War the plant was largely active in the manufacture of munitions.

John Goldie while residing in Esquesing married Elizabeth Alexander who died in 1869, leaving one son John who died in 1884. In 1870 the widower married Margaret Rodgers, who survived him for twenty-three years. To this second union there were born a son Alex R. and a daughter Eleanor, who married James Breckenridge and lives in Toronto. Another member of the family is Rebecca Goldie, an adopted daughter, now also living in Toronto.

Hugh McCulloch, Sr.

(1826 - 1910)

The following obituary of Hugh McCulloch was published on September 3, 1910 in *The Galt Daily Reporter:*

DEATH OF HUGH McCULLOCH SR.

Passed Away at His Residence on Blair Road Saturday Evening — Funeral Yesterday

The death occurred at his residence, Sorn House, Blair Road, on Saturday evening of Hugh McCulloch, Sr., one of the oldest and best known of Galt's captains of industry. Mr. McCulloch had been in poor health for some time past, and the news of his death, though received with sorrow, was not unexpected, as his advanced age, 84 years, made his recovery impossible.

Mr. McCulloch was a native of Ayrshire, Scotland, having been born at Sorn, September 19th, 1826. He arrived in Canada August 24th, 1850, after a rough ocean voyage, lasting several weeks. Mr. McCulloch lived in Ayr for a short time, coming to Galt May 28th, 1851. In 1859, with his partner, the late John Goldie, he purchased the Dumfries Foundry from James Crombie, founding the firm of Goldie & McCulloch, which for many years past has had a worldwide reputation for the quality of its products. At first, general foundry work was done, but as the business grew the firm went into the manufacture of boilers, engines, flour and sawmill machinery and woodworking machinery. Thirty-one years ago the firm went into the manufacture of safes and vaults, in which department great success was achieved. The advancement of the trade led to a joint stock company being formed in 1891. In 1896 Mr. Goldie died, and his son, A. R. Goldie, took his place, and is today manager. The firm employs in the neighborhood of 500 hands, and is Galt's largest industry. Mr. McCulloch retired from active work about four years ago, but retained the office of president until his death.

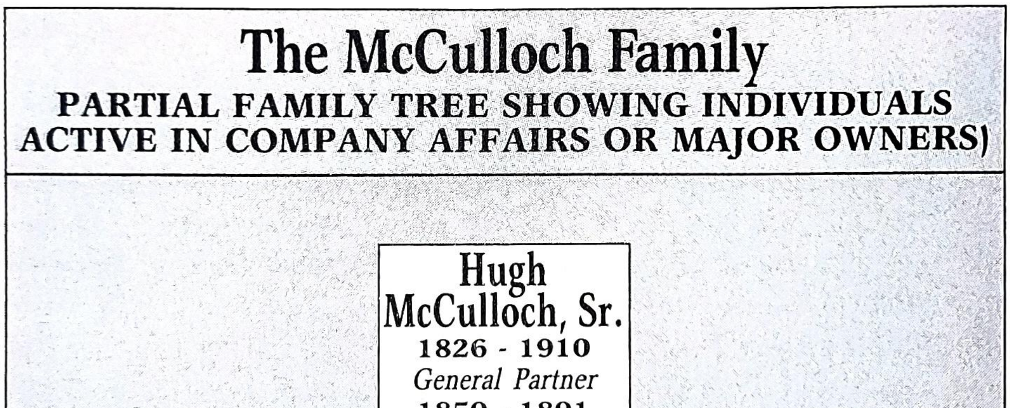
Politically, Mr. McCulloch, was a Conservative and he was a faithful and valued member of Knox Church. He always took a deep interest in public matters affecting Galt, and had been a member of the Council at different *times, and for over twenty-five years was a member of the Collegiate Institute Board.*

He was for many years a director of the Gore District Mutual Fire Insurance Company, of which he was vice-president for the past eight years, and was also a director of the Millers and Manufacturers' Insurance Company for a number of years, and to his wise counsel and business ability is due much of the success those institutions have attained.

Mr. McCulloch was one of the original Board of Directors of the Galt, Preston and Hespeler Railway, becoming its president on the death of the late Thomas Todd.

The Gas Works, started by Mr. English, was purchased by Mr. Mc- [line missing] vid Spiers, who built up the business, the two later on purchasing also the electric lighting plant.

In 1855 Mr. McCulloch was married to Janet McCartney, also a native of Ayrshire, Scotland. Mrs. McCulloch died in 1885, and the members of the family now living are Mr. R. O. McCulloch, secretary-treasurer,



The McCulloch Family

PARTIAL FAMILY TREE SHOWING INDIVIDUALS ACTIVE IN COMPANY AFFAIRS OR MAJOR OWNERS)

and Mr. Hugh McCulloch, vice-president of the Goldie-McCulloch Company, Limited, and Mrs. Chas. A. Shearson, of New York.
The funeral took place yesterday afternoon to Mount View Cemetery, Rev. Rural Dean Ridley officiating in the absence of Rev. R. E. Knowles, who is in Halifax. The pallbearers were foremen of the different departments of the Goldie-McCulloch works, Messrs. W. McBride, D. Hastings, R. Hunter, H. F. Bailey, D. Harriott and W. Fraser.
Flags on public buildings in town were flown at half mast and a large number were present from Galt, Preston, Hespeler, Berlin, Toronto and other places, to pay the last tribute of respect to an honored citizen and a true friend.

Mr. McCulloch began work with the Company in 1851 and was active in the Company's management until approximately 1906. He thus had about 55 years of continuous service with the Company.

APPENDIX 2

Long Service Employees

The following is a list of employees known to have served more than 50 years with the Company.

NAME	POSITION	YEAR RETIRED	YEARS OF SERVICE
John McEwan	Pattern Shop Foreman	1954	61
Lincoln W. Ingall	Fitter	1946	56
David Hastings	South Works Superintendent	1954	55
Hugh McCulloch, Sr.	President	1906	55
Arthur Garlick	Machinist	1959	53
David Anderson	Sales Service	1944	52
Alex. C. Fleming	Secretary-Treasurer	1947	51
James Stewart	Machinist	1954	51
William Sass	Paymaster	1954	51
Bethena Last	Clerk Typist — Purchasing	1959	51
Robert Barrie	Patternmaker	1960	51
Herbert Parkinson	Pump Engineer	1968	51
Carl Dorschell	Cost Accountant	1969	51
William Harrison	Draftsman	1976	51
James Jack	Fitter — Machine Shop	1953	50
Ed Purdy	Fitter	1959	50
Harold Harman	Machinist	1978	50

Notes:

1. An article in the November 2, 1923 edition of *The Galt Reporter* said that the individuals listed below were honored by the Company at the amalgamation dinner on November 1, 1923 and that all had between 50 and 56 years of service. The Company has no records of these individuals, but the newspaper account is believed to be accurate:

Robert Hunter	J. H. McGregor
Peter Henderson	James Linton

2. The Company's records indicate that George Evans, who retired on May 9, 1949 as a machine operator, joined the Company in December, 1891. The Company has been unable to confirm whether or not this service was continuous, but if it was, Mr. Evans had 57 years of service.
3. The Company's personnel records prior to about 1949 are not very complete. It is quite possible that a number of other employees besides those listed above reached 50 years of service even though they can no longer be identified nor their service substantiated. In the first hundred years of the Company's existence, it was not unusual for people to begin work between 14 and 16 years of age and to work into their 70's. Given changing work and retirement patterns, it is unlikely that there will be many additions to the above list.

BIOGRAPHY OF
John Andrew McEwan

John A. McEwan commenced employment with Goldie & McCulloch Company Limited as an apprentice patternmaker on May 14, 1893 at the age of 14 and remained in continuous employment with the firm until his retirement on August 31, 1954 at the age of 75, a service record of 61 years.

Mr. McEwan was born September 28, 1878, and was a lifelong resident of Cambridge. He spent his childhood with three sisters in the home of his parents Walter McEwan and Dorcas (Alderson) McEwan.

He was educated at Dickson Public School until age 14 when he commenced his apprenticeship in 1893. His mother, Dorcas, signed his apprenticeship papers along with Hugh McCulloch, Jr., secretary-treasurer of the Goldie & McCulloch Company Limited.

In 1904, at the age of 26, he was promoted to the position of foreman of the pattern shop, a position he was to hold for the next 50 years. During his early years with "Goldies" he also found time to teach drafting, a skill which was largely self-taught, at Galt Collegiate and Vocational School.

In 1906 he bought a large house at 20 Elliott Street, presently the site of the James Place retirement bed rest home, where he lived for six years.

John McEwan was a devoted church member of Knox Presbyterian Church until 1925 when he became a member of First United Church in Cambridge. His intolerance for alcoholism and profanity was legendary and was reflected in the good character of many young men who were apprenticed under his watchful care.

Babcock & Wilcox Canada historical records contain several Pattern Work Books and Time Books prepared by Mr. McEwan in which he commented not only on the pattern trade, but also noted items of local interest including significant funerals, visiting dignitaries, political comments, and his personal observations on many individuals and incidents. These books provide an interesting contemporary commentary on events in the Company and the community from 1904 to 1910 and from 1936 to 1954.

Mr. McEwan was a bachelor and lived for many years at 283 Main Street E. with two of his sisters, Miss Frances and Miss Dorcas. Another sister, Jeanie, married a local millwright, John C. McKenzie.

In his later years, John lived at 28 Lowery St. S., Cambridge until his death on February 10, 1967, at age 88 after a brief illness.

BIOGRAPHY OF

Lincoln William Harvey Ingall

Lincoln W. H. Ingall was born January 17, 1866 at 28 Glebe Street, in Galt. He was the son of Thomas Tyndall Ingall and Arvilla (Rockwell). His father's family was from Lincolnshire, England, had emigrated to America in 1852, and were among United Empire Loyalists who came north to Canada. Thomas Ingall worked for Goldie McCulloch & Co. from 1863 until his death in 1888.

Young Lincoln attended Central Public School on Main Street (Galt) until 1880 when, at age 14, he commenced his apprenticeship with Goldie, McCulloch & Co. as a machinist. He left the Company in 1885 and went to work for the Watts-Campbell Company in Newark, New Jersey. The Watts-Campbell Company manufactured and installed Corliss Steam Engines which later became a prominent Goldie & McCulloch product line.

Linc returned to Canada in 1894 and worked for the Waterous Company in Brantford for a few months before returning to Goldie & McCulloch in 1895 as a full time employee. He then worked continuously in the company's employ until he retired in 1946 at the age of 80.

During the latter period of employment, Linc was for the most part an installation superintendent, supervising the installation of Goldie & McCulloch machinery all over Canada. For many years prior to retirement, he was engaged in repair and maintenance work on engines he had previously installed.

In 1888, he married Evelina Valois Bowes and they had one son (Harvey) and four daughters (Elizabeth, Arvilla, Thomason, and Thelma). Linc's wife, Evelina, died in 1906 at age 40, leaving him with the formidable task of raising the large family in the house he built at 75 Barrie Street in Galt.

Lincoln was an enthusiastic Free Mason and served as a Chapter Principal (Waterloo) and District Deputy Grand Master (Wellington). He was also a long time member of Wesley Methodist (now Wesley United) Church in Galt. His wife, Eva, was a talented soprano and frequently sang in Wesley Church.

Lincoln Ingall died in 1961 at age 95 at the South Waterloo Hospital in Galt after having spent his last few years in Conestoga in the care of his daughter Arvilla (Klaehn).

At the time of his death, his youngest daughter, Thelma, wrote to the Company advising that her father "was grateful for the pension paid to him" and that "he had many happy memories of his association with the firm".

Combining Mr. Ingall's latter period of service (1895-1946) with his early service (1880-1885) gives him 56 years of service with the Company.

APPENDIX 3

Proprietors, Partners, and Presidents

GENERAL PARTNERS

James K. Andrews James A. Crombie	1844 - approximately 1850

SOLE PROPRIETOR

James A. Crombie	1850 - August 7, 1859

GENERAL PARTNERS

John Goldie and Hugh McCulloch, Sr.	August 8, 1859 - April 20, 1891

PRESIDENTS

Hugh McCulloch, Sr.	April 21, 1891 - September 7, 1910
Hugh McCulloch, Jr.	September 8, 1910 - January 10, 1917
Robert O. McCulloch	January 11, 1917 - December 31, 1931
Alexander R. Goldie	January 1, 1932 - June 3, 1934
Hugh L. McCulloch	June 4, 1934 - November 16, 1951
William A. Osborne	November 17, 1951 - December 31, 1958
R. Morton Robertson	January 1, 1959 - March 16, 1967
J. McDonald Douglas	March 17, 1967 - June 30, 1976
Thomas M. Campbell, Jr.	July 1, 1976 - February 15, 1980
Joe J. Stewart	February 16, 1980 - June 30, 1984
Robert E. Donovan	July 1, 1984 - August 31, 1987
Paul P. Koenderman	September 1, 1987 -

APPENDIX 4

TYPICAL TURN OF THE CENTURY *Articles of Apprenticeship*

THIS INDENTURE

made the **25TH** day of **MAY** in the Year of our Lord, One Thousand **NINE HUNDRED AND ONE.**

Between **MR. G. R. BARRIE** of the **TOWN OF GALT** in the **COUNTY OF WATERLOO** and Province of Ontario, of the first part; **R. J. BARRIE** now of or about the age of **EIGHTEEN** years, of the second part, and *The Goldie & McCulloch Co., (Ltd.,)* of the TOWN OF GALT, in the County of Waterloo aforesaid trading under the name, style and firm of *"The Goldie & McCulloch Co., (Ltd.,)"* Ironfounders, Machinists, &c., of the third part:

Witnesseth, That the said party of the first part, by and with the consent of the said party of the second part, now a minor of the age of **18** years or thereabouts, testified by his signing, sealing and becoming a party to these presents doth hereby put, place, bind and indent him, the said party of the second part, to the said *Goldie & McCulloch Co., (Ltd.,)* to learn the art and trade of **A PATTERN MAKER** and with them, the said parties of the third part, *The Goldie & McCulloch Co., (Ltd.,)* after the manner of an Apprentice, to serve from the day of the date hereof, for and during the term of **FOUR** years, each of said years to consist of or to be equal to (in the aggregate) three thousand one hundred working hours.

And the said party of the first part, as surety for the said party of the second part, and the said party of the second part for himself, do hereby covenant, promise and agree to and with the said parties of the third part, that during the said term of **FOUR** years the said party of the second part shall well and faithfully serve the said parties of the third part, their secrets keep and lawful commands at all times obey, and at all times protect and preserve the goods and property of his said Masters, and not suffer or allow any to be injured or wasted, and shall give and devote to them ten hours during each working day, or such other number of hours according to what may be the regulations of the workshop as to hours of working for the time being, or as special exigencies in business may require; that he will not during the said term join or become a member of any society, association or company that controls, claims or attempts to control his actions or his labor in any way, or by reason of his being a member of which would cause or tend to cause him to act in any manner detrimental to the interests of the said parties of the third part, and that he will not practice any unlawful sports, nor waste, injure or destroy the property of his Masters, nor absent himself from his said Masters' service on any working day without leave during the said term, but conduct himself in a sober, temperate, honest manner, and as a good and faithful Apprentice ought to do during all the time aforesaid.

And the said parties of the third part, do hereby covenant, promise and agree to and with the said party of the second part, that they, the said parties of the third part, shall and will teach and instruct, or cause to be taught and instructed, the said party of the second part (providing that they the said parties of the third part, remain in business for and during the aforesaid term) in the art and trade of a **PATTERN-MAKER** and also in lieu of board, lodging, food and clothing, to pay or cause to be paid to the said party of the second part the sum of four cents per hour for each hour actually worked during the first period of three thousand one hundred hours; the sum of four cents and a-half per hour for each hour actually worked during the second period of three thousand one hundred hours; the sum of five cents per hour for each hour actually worked during the third period of three thousand one hundred hours; and the sum of five cents and a-half per hour for each hour actually worked during the fourth period of three thousand one hundred hours;

but none of said payments shall become due or payable oftener than once in every two weeks during the said term. The first of such fortnightly payments to become due and be made on the **FIRST** day of **JUNE** one thousand **NINE HUNDRED AND ONE**

And the said parties of the third part further agree to pay to the said parties of the second part a *bonus* of **FIFTY** Dollars after the full and faithful completion of his Apprenticeship to the entire satisfaction of the said parties of the third part, at the end of said term.

And the said parties of the third part shall provide board and lodging for the said party of the second part while absent from the shop of the said parties of the third part, and attending as such Apprentice to their work in the country or elsewhere outside of Galt, and while they pay his board and private lodging for him as aforesaid, they shall only pay the said party of the second part the difference between four cents per hour and the wages he is entitled to receive under and by virtue of the covenant with regard to wages hereinbefore mentioned.

And it is hereby further understood and agreed that nothing herein contained shall bind the said parties of the third part to keep the said party of the second part as an apprentice should he prove insubordinate or insufficient or unsatisfactory in any respect to the said parties of the third part, and the said parties of the third part shall have full power to discharge the said party of the second part for any of the above causes, the existence of which shall be determined by the said parties of the third part, in their discretion, and their determination shall be final and conclusive.

In Witness Whereof, the said parties hereto have hereunto set their hands and seals, the day and year first above written.

Signed, Sealed and Delivered,
in the presence of

JESSE SHELLARD

GEORGE R. BARRIE
ROBERT J. BARRIE
The Goldie & McCulloch Co. Limited
R. O. McCULLOCH
Secy-Treas.

APPENDIX 5

Babcock & Wilcox Canada

Fossil Utility Steaming Capacity

ORDERS THRU JUNE, 1986

UTILITY	NO. OF UNITS	TOTAL POUNDS OF STEAM PER HOUR
Ontario Hydro	26	52,300,000
Israel Electric	8	16,328,000
HIPDC (China)	4	10,627,200
P.L.N. (Indonesia)	5	10,603,000
New Brunswick Electric Power Commission	7	8,584,100
Edmonton Power	14	7,880,000
Nova Scotia Power Corporation	9	4,850,000
Comision Federal de Electricidad (Mexico)	2	4,300,000
Saskatchewan Power Corporation	9	4,245,000
Enelven (Venezuela)	3	3,495,000
Nova Scotia Light & Power	9	3,264,000
Alberta Power	3	2,250,000
Manitoba Hydro	3	2,125,000
New Zealand Ministry of Works (N.Z. Electric)	4	2,101,000
Electricity Generating Authority of Thailand	3	1,986,000
Sao Paulo Light & Power	2	1,700,000
C.A. Energia Electrica de Venezuela	2	1,680,000
Canadian Utilities Limited	1	1,350,000
Newfoundland Light & Power	3	1,350,000
Calgary Power	2	1,250,000
Winnipeg Hydro	4	695,000
City of Regina	2	600,000
Canadian Commercial Corporation (Sukkur)	4	564,000
Maritime Electric Co. Ltd.	4	540,000
Canada Electric	2	250,000
Others	5	205,000
TOTAL	140	145,122,300

APPENDIX 6

Babcock & Wilcox Canada

Nuclear and Fossil Utility Reference List

(OVER 50 MW)

FOSSIL

CONTRACT NO.	CUSTOMER	STATION / LOCATION
4000	ONTARIO HYDRO, WINDSOR, ONTARIO	J. CLARK KEITH
4060	ONTARIO HYDRO, TORONTO, ONTARIO	RICHARD L. HEARN
4190	ONTARIO HYDRO, TORONTO, ONTARIO	RICHARD L. HEARN
4200/4280	ONTARIO HYDRO	J. CLARK KEITH WINDSOR, ONTARIO
4255	SAO PAUL LIGHT & POWER SAO PAULO, BRAZIL	SAO PAULO
4436	CALGARY POWER, WABAMUN, ALBERTA	WABAMUN
4540	ONTARIO HYDRO, TORONTO, ONTARIO	RICHARD L. HEARN
4557	SASKATCHEWAN POWER CORPORATION	BOUNDARY DAM ESTEVAN, SASKATCHEWAN
4577	CALGARY POWER	WABAMUN, WABAMUN, ALBERTA
4620	ONTARIO HYDRO	RICHARD L. HEARN TORONTO, ONTARIO
4625	MANITOBA HYDRO	SELKIRK, SELKIRK, MANITOBA
4660	CITY OF EDMONTON	ROSSDALE, EDMONTON, ALBERTA
4685/4690	ONTARIO HYDRO	LAKEVIEW, TORONTO, ONTARIO
5070	CITY OF EDMONTON	ROSSDALE, EDMONTON, ALBERTA
5305	NEW BRUNSWICK ELECTRIC POWER COMMISSION	GRAND LAKE 2 MINTO, NEW BRUNSWICK
5325/5330	ONTARIO HYDRO	LAKEVIEW, TORONTO, ONTARIO
5430	NOVA SCOTIA LIGHT & POWER CORPORATION	TUFT'S COVE DARTMOUTH, NOVA SCOTIA
5640	CITY OF EDMONTON	ROSSDALE, EDMONTON, ALBERTA
5690	NEW BRUNSWICK ELECTRIC POWER COMMISSION	COURTENAY BAY SAINT JOHN, NEW BRUNSWICK
5700/5705	ONTARIO HYDRO	LAKEVIEW, TORONTO, ONTARIO
5775	NOVA SCOTIA POWER CORPORATION	GLACE BAY GLACE BAY, NOVA SCOTIA
5930	NEW BRUNSWICK ELECTRIC POWER COMMISSION	COURTENAY BAY SAINT JOHN, NEW BRUNSWICK
5950	NEW ZEALAND MINISTRY OF WORKS	MARSDEN MARSDEN PT., NEW ZEALAND
6250	NOVA SCOTIA POWER CORPORATION	TRENTON TRENTON, NOVA SCOTIA
6280	NOVA SCOTIA POWER CORPORATION	PT. TUPPER PT. TUPPER, NOVA SCOTIA
6285, 6375	CITY OF EDMONTON	CLOVER BAR, EDMONTON, ALBERTA
6315	MANITOBA HYDRO	BRANDON, BRANDON, MANITOBA
6400/05 6410/15	ONTARIO HYDRO	NANTICOKE, NANTICOKE, ONTARIO
6600	SASKATCHEWAN POWER CORPORATION	QUEEN ELIZABETH SASKATOON, SASKATCHEWAN
6705, 6820	ISRAEL ELECTRIC	ESHKOL, HAIFA, ISRAEL
6710	NOVA SCOTIA LIGHT & POWER CORPORATION	TUFT'S COVE DARTMOUTH, NOVA SCOTIA

NO. OF UNITS	CAP. MW EA	TYPE BOILER	M.LBS./HR CAP. EA.	DESIGN PRESS.	TOTAL STEAM TEMP. °F	FUEL	YEAR OF AWARD
2	66	2 Dr.	650	1000	900	Coal	1948
2	100	2 Dr.	850	1000	900	Coal	1949
2	100	2 Dr.	850	1000	900	Coal	1951
2	66	2 Dr.	650	1000	900	Coal	1951
2	100	2 Dr.	850	1000	925	Oil	1951
1	66	Rad.	625	1020	900	Gas	1954
1	200	Rad.	1350	2200	1000/1000	Coal	1956
1	66	Rad.	600	1000	916	Lig.	1956
1	66	Rad.	625	1020	900	Gas	1956
1	200	Rad.	1350	2200	1000/1000	Coal	1957
2	66	2 Dr. St.	625	1020	915	Lig.	1957
1	75	2 Dr. St.	660	975	900	O&G	1957
2	300	Rad.	2000	2750	1000/1000	Coal	1958
1	75	2 Dr. St.	660	975	900	O&G	1960
1	70	Rad.	500	1650	1000	Coal	1961
2	300	Rad.	2000	2750	1000/1000	Coal	1962
1	100	Rad.	725	2100	1010/1010	Coal	1962
1	75	2 Dr. St.	660	975	900	Gas	1963
1	100	Rad.	700	2050	1005/1005	Pitch	1963
2	300	Rad.	2000	2870	1000/1000	Coal	1964
2	150	Rad.	550	2250	1030	Coal	1964
1	100	Rad.	700	2050	1005/1005	Pitch	1965
2	120	Rad	985	1725	1005	Oil	1965
1	150	Rad.	1050	1900	1005/1005	Coal/Oil	1966
2	100	Rad.	600	2250	1030	Coal	1966
2	165	Rad.	1100	2100	1000/1000	Gas	1966
1	125	Rad.	875	1500	950	Lig.	1967
4	500	Rad.	3600	2875	1000/1000	Coal	1967
1	100	Rad.	850	1525	960	NGas/Oil	1968
2	275	Rad.	1450	2425	1005	Oil	1969
1	100	Rad.	669	2150	1010/1010	Oil	1969

(Cont'd.)

APPENDIX 6 — *Nuclear and Fossil Utility Reference List*

CONTRACT NO.	CUSTOMER	STATION / LOCATION
6777	CANADIAN UTILITIES LIMITED	H.R. MILNER, GRANDE CACHE, AL.
6950/55 6960/65	ONTARIO HYDRO	NANTICOKE, NANTICOKE, ONTARIO
7020, 7021	NEW BRUNSWICK ELECTRIC POWER COMMISSION	COLSON'S COVE LORNEVILLE, NEW BRUNSWICK
7085/7090	ISRAEL ELECTRIC CORPORATION	ESHKOL, HAIFA, ISRAEL
7089/7091	EDMONTON POWER CORPORATION	CLOVER BAR, EDMONTON, ALBER,
7129	NEW BRUNSWICK ELECTRIC POWER COMMISSION	COLESON'S COVE 3 LORNEVILLE, NEW BRUNSWICK
7135/7140	COMMISSION FEDERAL DE ELECTRICIDAD	TULA, TULA, MEXICO
7145	NOVA SCOTIA POWER CORPORATION	TUFTS COVE DARTMOUTH, NOVA SCOTIA
7209	ALBERTA POWER (FOR SYNCRUDE)	MILDRED LAKE, ALBERTA
7280/7285	ELECTRICITY GENERATING AUTHORITY OF THAILAND	MAE MOH UNITS 1&2 MAE MOH, THAILAND
7324-7327	ISRAEL ELECTRIC (REPLACE C/7141-44)	MAOR DAVID STATION HADERA, ISRAEL
7359	SASKATCHEWAN POWER CORPORATION	POPLAR RIVER CORONACH, SASKATCHEWAN
7376	C.A. ENERGIA ELECTRICA DE VENEZUELA	ARREAGA STATION 13A MARACAIBO, VENEZUELA
7391	NEWFOUNDLAND AND LABRADOR HYDRO	HOLYROOD HOLYROOD, NEWFOUNDLAND
7395	C.A. ENERGIA ELECTRICA DE VENEZUELA	RAMON LAGUNA MARACAIBO, VENEZUELA
7415	ELECTRICITY GENERATING AUTHORITY OF THAILAND	MAE MOH UNIT 3 MAE MOH, THAILAND
7422	ONTARIO HYDRO	ATIKOKAN, ATIKOKAN, ONTARIO
7439, 7440/7445	C.A. ENERGIA ELECTRICA DE VENEZUELA	RAMON LAGUNA MARACAIBO, VENEZUELA
7455/7460	MARUBENI CORPORATION FOR SURALAYA	SURALAYA 1 AND 2 SURALAYA, INDONESIA
7518, 7519	PERUSAHAAN UMUM LISTRIK NEGARA	SURALAYA 3 AND 4 SURALAYA, INDONESIA
7563/7571	HUANENG INTERNATIONAL POWER DEVELOPMENT CORPORATION	SHANG-AN 1 AND 2 SHANG-AN, CHINA
7569, 7570	HUANENG INTERNATIONAL POWER DEVELOPMENT CORPORATION	NANTONG 1 AND 2 NANTONG, CHINA

NUCLEAR

CONTRACT NO.	CUSTOMER	STATION / LOCATION
6110/15 6120/25	ONTARIO HYDRO	PICKERING A PICKERING, ONTARIO
6230	ATOMIC ENERGY OF CANADA LIMITED	KANUPP 1 KARACHI, PAKISTAN
6900/05 6910/15	ONTARIO HYDRO	BRUCE A KINCARDINE, ONTARIO
7195	HYDRO QUEBEC	GENTILLY 2, GENTILLY, QUEBEC
7305	NEW BRUNSWICK ELECTRIC POWER COMMISSION	PT. LEPREAU PT. LEPREAU, NEW BRUNSWICK
7210	AECL FOR COMISION NACIONAL DE ENERGIA ATOMICA	RIO TERCERO RIO TERCERO, ARGENTINA
7225-7228	ONTARIO HYDRO	PICKERING B, PICKERING, ONTARIO
7365-7368	ONTARIO HYDRO	BRUCE B, KINCARDINE, ONTARIO
7417-7420	ONTARIO HYDRO	DARLINGTON A, DARLINGTON, ONTA
7505, 7506	ROMENERGO	CERNAVODA 1 AND 2 CERNAVODA, ROMANIA

nt'd.)

OF	CAP. MW EA	TYPE BOILER	M.LBS./HR CAP. EA.	DESIGN PRESS.	TOTAL STEAM TEMP. °F	FUEL	YEAR OF AWARD
1	150	Rad.	1350	1500	955	P.C.	1969
4	500	Rad.	3600	2875	1000/1000	Coal	1970
2	318	Rad.	2158	2875	1005	Oil	1972
2	228	RB	1602	2050/2150	1005/1005	Oil	1972
	165	RB	1110	2150	1000	Gas	1972
1	318	RB	2158.1	2450/2575	1005	Oil	1973
2	300	RB	2150	2490	1005	Oil/Gas	1973
1	150	RB	1050	2150	1005	Oil	1973
3	100	PFT	750	1150	950	Gas	1974
2	75	RB	662	1325	959	Pulv. Coal	1974
4	395	RB	2556	2050	1005	Coal/Oil	1974
1	300	RB	1950	1900	1005	Pulv. Coal	1975
1	100	PFT	840	1550	955	O&G	1976
1	150	RB	1050	2200	1005	Oil	1977
1	100	PFT	840	1550	955	O&G	1977
1	75	RB	662	1500	965	Coal	1978
1	200	RB	1400	2750	1000	Lig.	1978
3	160	RB	1165	1800	1005	Oil	1979
2	400	RB	2576	2800	1004	Coal/Oil	1980
2	400	RB	2692	2800	1005	Coal	1984
	350	RB	2623	2925	1005	Coal	1986
	350	RB	2623	2975	1005	Coal	1986

OF CTOR ITS	CAP. MW EA	NO. OF S.G.'S	PRIM. PRESS.	SEC. PRESS.	STEAM TEMP.°F	YEAR OF AWARD
4	515	48	1250	593	485	1965 and 1966
1	126	6	1250	593	485	1966
4	760	32	1350	635	492	1970
1	638	4	1435	681	500	1973
1	630	4	1435	681	500	1974
1	600	4	1435	681	500	1974
4	516	48	1250	593	485	1974
4	815	32	1350	635	492	1975
4	881	16	1435	735	508	1978
2	600	8	1435	681	500	1983

APPENDIX 7 — SECTION 1

Babcock & Wilcox Canada

War-Time (WWII) and Royal Canadian Navy

(1940 TO 1959)

CONTRACT NO.	CLASS OF SHIP	SHIPYARD	SHIPYARD LOCATION
171'-6" STEAM DRIVEN MINE SWEEPING VESSELS (2 BOILERS PER VESSEL)			
2850	BANGOR	DUFFERIN SHIPBUILDING CO. LTD.	TORONTO, ONT.
2970	BANGOR	DUFFERIN SHIPBUILDING CO. LTD.	TORONTO, ONT.
3025	BANGOR	DUFFERIN SHIPBUILDING CO. LTD.	TORONTO, ONT.
3105	BANGOR	TORONTO SHIPBUILDING CO. LTD.	TORONTO, ONT.
190' PATROL VESSELS (CORVETTES) — (2 BOILERS PER VESSEL)			
3021	CORVETTE	MIDLAND SHIPBUILDING CO.	MIDLAND, ONT.
3022	CORVETTE	VICTORIA MACHINERY DEPOT	VICTORIA, B.C.
3023	CORVETTE	YARROWS LTD.	VICTORIA, B.C.
3051	CORVETTE	COLLINGWOOD SHIPYARDS LTD.	COLLINGWOOD, ONT.
3052	CORVETTE	KINGSTON SHIPBUILDING CO.	KINGSTON, ONT.
ADMIRALTY ALGERINE CLASS MINE SWEEPERS (2 BOILERS PER VESSEL)			
3185	ALGERINE	TORONTO SHIPBUILDING CO.	TORONTO, ONT.
3186	ALGERINE	TORONTO SHIPBUILDING CO.	TORONTO, ONT.
3187	ALGERINE	TORONTO SHIPBUILDING CO.	TORONTO, ONT.
3275	ALGERINE	REDFERN CONSTRUCTION CO. LTD.	TORONTO, ONT.
3330	ALGERINE	REDFERN CONSTRUCTION CO. LTD.	TORONTO, ONT.
3370	ALGERINE	REDFERN CONSTRUCTION CO. LTD.	TORONTO, ONT.
3371	ALGERINE	REDFERN CONSTRUCTION CO. LTD.	TORONTO, ONT.
3372	ALGERINE	REDFERN CONSTRUCTION CO. LTD.	TORONTO, ONT.
TRANSPORT FERRY			
3485	TRANSPORT FERRY	WARTIME SHIPBUILDING 4 SHIPPED TO MARINE INDUSTRIES LTD., SOREL, P.Q.; 2 CANCELLED)	MONTREAL, QUE.

rine Boiler Reference List

NO. OF UNITS	TYPE BOILER	CAPACITY EACH	STEAM / HR. TOTAL	DESIGN PRESS. (PSI)	CONTRACT AWARD
8	THREE DRUM BENT TUBE			250	1940
4	THREE DRUM BENT TUBE			250	1940
12	THREE DRUM BENT TUBE			250	1941
8	THREE DRUM BENT TUBE			250	1941
32					
4	CROSS DRUM MARINE	22,000	88,000	225	1940
4	CROSS DRUM MARINE	22,000	88,000	225	1940
4	CROSS DRUM MARINE	22,000	88,000	225	1940
4	CROSS DRUM MARINE	22,000	88,000	225	1941
2	CROSS DRUM MARINE	22,000	44,000	225	1941
18					
10	THREE DRUM ADMIRALTY			250	1942
10	THREE DRUM ADMIRALTY			250	1942
10	THREE DRUM ADMIRALTY	(3150 SQ. FT. HEATING SURFACE PER BOILER)		250	1942
12	THREE DRUM ADMIRALTY			250	1942
14	THREE DRUM ADMIRALTY			250	1942
10	THREE DRUM ADMIRALTY			250	1943
10	THREE DRUM ADMIRALTY			250	1943
2	THREE DRUM ADMIRALTY			250	1943
78					
6	THREE DRUM ADMIRALTY				1944
4 shipped					

(Cont'd.)

CONTRACT NO.	HULL NO.	SHIPYARD	SHIPYARD LOCATION
A/S (ANTI-SUBMARINE) DESTROYER ESCORT (DE205 AND CLASS) VESSELS			
4171	DE 205	CANADIAN VICKERS LTD.	MONTREAL, P.Q.
	DE 229	CANADIAN VICKERS LTD.	MONTREAL, P.Q.
4172	DE 207	BURRARD DRY DOCK CO. LTD.	VANCOUVER, B.C.
	DE 233	BURRARD DRY DOCK CO. LTD.	VANCOUVER, B.C.
4173	DE 206	HALIFAX SHIPYARDS LTD.	HALIFAX, N.S.
	DE 230	HALIFAX SHIPYARDS LTD.	HALIFAX, N.S.
4174	DE 234	MARINE INDUSTRIES LTD.	SOREL, P.Q.

*AUX. BLR. — 5,000 LB. SAT.

CONTRACT NO.	HULL NO.	SHIPYARD	SHIPYARD LOCATION
A/S (ANTI-SUBMARINE) DESTROYER ESCORT (DDE 257 AND CLASS) VESSELS			
4285	DDE 235	HALIFAX SHIPYARDS LTD.	HALIFAX, N.S.
	DDE 236	DAVIE SHIPBUILDING LTD.	LAUZON, P.Q.
	DDE 256	MARINE INDUSTRIES LTD.	SOREL, P.Q.
	DDE 257	CANADIAN VICKERS LTD.	MONTREAL, P.Q.
	DDE 258	BURRARD DRY DOCK CO. LTD.	VANCOUVER, B.C.
	DDE 259	VICTORIA MACHINERY DEPOT	VICTORIA, B.C.
	DDE 260	BURRARD DRY DOCK CO. LTD.	VANCOUVER, B.C.
A/S (ANTI-SUBMARINE) DESTROYER ESCORT (DDE 261 AND CLASS — REPEAT			
4775	DDE 261	CANADIAN VICKERS LTD.	MONTREAL, P.Q.
	DDE 262	VICTORIA MACHINERY DEPOT CO. AND YARROWS LTD.	VICTORIA, B.C.
	DDE 263	BURRARD DRY DOCK CO. LTD.	VANCOUVER, B.C.
	DDE 264	DAVIE SHIPBUILDING LTD.	LAUZON, P.Q.
	DDE 265	HALIFAX SHIPYARDS LTD.	HALIFAX, N.S.
	DDE 266	MARINE INDUSTRIES LTD.	SOREL, P.Q.

adian Navy Marine Boiler Reference List (Cont'd.)

NO. OF UNITS MAIN BLR.	AUX. BLR.	TYPE BOILER	CAPACITY EACH	MAIN BLR. STEAM / HR. TOTAL	DESIGN PRESS. (PSI)	STEAM TEMP. °F	CONTRACT AWARD
2 BY ARROW (UK)	1	SELECTABLE SUPERHEAT MARINE BOILER	135,000	270,000	580	850	1950
2	1	''	135,000	270,000	580	850	1950
2	1	''	135,000	270,000	580	850	1950
2	1	''	135,000	270,000	580	850	1950
2	1	''	135,000	270,000	580	850	1950
2	1	''	135,000	270,000	580	850	1950
2	1	''	135,000	270,000	580	850	1950
12	7						
M / HR. OIL FIRED AUTOMATIC BOILER, 120 PSI DESIGN PRESSURE							
2	1	SELECTABLE SUPERHEAT MARINE BOILER	135,000	270,000	580	850	1951
2	1	''	135,000	270,000	580	850	1951
2	1	''	135,000	270,000	580	850	1951
2	1	''	135,000	270,000	580	850	1951
2	1	''	135,000	270,000	580	850	1951
2	1	''	135,000	270,000	580	850	1951
2	1	''	135,000	270,000	580	850	1951
14	7						
GOUCHE) VESSELS							
2		SELECTABLE SUPERHEAT MARINE BOILER	135,000	270,000	580	850	1959
2		''	135,000	270,000	580	850	1959
2		''	135,000	270,000	580	850	1959
2		''	135,000	270,000	580	850	1959
2		''	135,000	270,000	580	850	1959
2		''	135,000	270,000	580	850	1959
12							

APPENDIX 7 — SECTION 2

Babcock & Wilcox Canada

Marine Boiler Reference List

(1958 TO 1971)

CONTRACT NO.	SHIP (SHIP TYPE AND / OR CUSTOMER)	SHIPYARD LOCATION
4717	CMS WOLFE	OTTAWA, ONT.
5095	SS HAMILTONIAN	SAINT JOHN, N.B
5135	SS MONTREALAIS	MONTREAL, QUE.
5205	SS BLACK BAY	COLLINGWOOD, ONT.
5225	SS NEW BRUNSWICKER	SAINT JOHN, N.B.
5318	SS FRANKCLIFFE HALL	LAUZON, QUEBEC
5335	SS BAIE ST. PAUL	LAUZON, QUEBEC
5347	SS MURRAY BAY	COLLINGWOOD, ONT.
5360	SS QUEBECOIS	MONTREAL, QUE.
5535	SS BAIE ST. PAUL (SAINT JOHN SHIPBUILDING)	SAINT JOHN, N.B.
5575	CAPE BRETON MINER	PORT WELLER
5670	CCGS VANCOUVER (DOT WEATHERSHIP) (BURRARD DRYDOCK)	VANCOUVER, B.C.
5698	SS ONTARIO POWER (PORT WELLER DRYDOCK)	PORT WELLER, ONT.
5750	SS DON DE DIEU (CANADIAN VICKERS)	MONTREAL, QUE.
5825	CCGS QUADRA (DOT WEATHERSHIP #2) (BURRARD DRYDOCK	VANCOUVER, B.C.
5890	LOUIS ST. LAURENT (DOT ICEBREAKER) (CANADIAN VICKERS)	MONTREAL, QUEBEC
5900	MT IMPERIAL ACADIA (PORT WELLER DRYDOCKS)	PORT WELLER, ONT.
6325	PROTECTEUR PRESERVER (SAINT JOHN SHIPBUILDING)	SAINT JOHN, N.B.
6640	(KENT LINES)	SAINT JOHN, N.B.
6974	(SAINT JOHN SHIPBUILDING)	SAINT JOHN, N.B.
6975	(SAINT JOHN SHIPBUILDING)	SAINT JOHN, N.B.
6976	(SAINT JOHN SHIPBUILDING)	SAINT JOHN, N.B.
		TOTAL

NOTES: 1. All boilers in both sections 1 and 2 are oil fired.
2. Contracts 6640, 6974, 6975, and 6976 were not conventional marine boilers; they were marine FM's.

NO. OF UNITS	CAPACITY EACH	STEAM / HR. TOTAL	TOTAL DESIGN PRESS.	STEAM TEMP. °F	CONTRACT AWARD
2	28,000	56,000	300	560	1958
2	40,000	80,000	520	780	1960
2	40,000	80,000	520	780	1961
2	50,000	100,000	600	760	1961
2	40,000	80,000	520	780	1961
2	50,000	100,000	575	700	1962
2	50,000	100,000	575	770	1962
2	50,000	100,000	575	770	1962
2	40,000	80,000	520	770	1962
2	65,000	130,000	750	850	1963
1	95,000	95,000	600	810	1963
2	52,600	105,200	550	760	1963
1	95,000	95,000	600	810	1963
2	52,000	104,000	520	780	1964
2	52,600	105,200	550	760	1964
2	100,000	200,000	750	850	1964
1	20,000	20,000	200	SAT.	1965
4	107,000	428,000	725	865	1967
2	25,000	50,000	260	—	1969
1	60,000	60,000	300	SAT.	1971
1	60,000	60,000	300	SAT.	1971
1	60,000	60,000	300	SAT.	1971
40		2,288,400			

APPENDIX 8A

Babcock & Wilcox Canada

Recovery Boiler Reference List

CONTRACT NO.	CUSTOMER	LOCATION
1151	CANADA PAPER COMPANY	WINDSOR MILLS, QUEBEC
1614	CANADA PAPER COMPANY	WINDSOR MILLS, QUEBEC
2272	BROMPTON PULP & PAPER CO.	EAST ANGUS, QUEBEC
2393	CROWN ZELLERBACH CANADA LTD.	OCEAN FALLS, BRITISH COLUMBIA
2710	BATHURST PAPER LTD.	BATHURST, NEW BRUNSWICK
3445	MARATHON CORPORATION OF CANADA	MARATHON, ONTARIO
3730	DOMTAR PULP & PAPER LTD.	WINDSOR, QUEBEC
3770	DOMTAR PULP & PAPER LTD.	CORNWALL, ONTARIO
4240	CROWN ZELLERBACH CANADA LTD.	OCEAN FALLS, BRITISH COLUMBIA
4451	CROWN ZELLERBACH CANADA LTD.	OCEAN FALLS, BRITISH COLUMBIA
4750	IRVING PULP & PAPER LTD.	SAINT JOHN, NEW BRUNSWICK
4890	RAYONIER CANADA (B.C.) LTD.	WOODFIBRE, BRITISH COLUMBIA
5065	PRICE BROTHERS & CO. LTD.	KENOGAMI, QUEBEC
5315	MacMILLAN BLOEDEL LTD.	HARMAC, BRITISH COLUMBIA
5320	MacMILLAN BLOEDEL LTD.	PORT ALBERNI, BRITISH COLUMBIA
5350	CROWN ZELLERBACH CANADA LTD.	CAMPBELL RIVER, BRITISH COLUMBIA
5585	CIA MANUFACTURERA DE POPELES Y CARTANES, S.A.	LAJA, CHILE
5625	RAYONIER CANADA (B.C.) LTD.	WOODFIBRE, BRITISH COLUMBIA
5660	PRINCE GEORGE PULP & PAPER LTD.	PRINCE GEORGE, BRITISH COLUMBIA
5710	ABITIBI POWER & PAPER CO. LTD.	SMOOTH ROCK FALLS, ONTARIO
5815	DOMTAR PULP & PAPER LTD.	BELLE RIVER, QUEBEC
5855	SKEENA KRAFT LTD.	WATSON ISLAND, BRITISH COLUMBIA
5940	SCOTT MARITIMES PULP LTD.	ABERCROMBIE POINT, NOVA SCOTIA
6150	INTERNATIONAL PULP CO. LTD.	PRINCE GEORGE, BRITISH COLUMBIA
6210	PRINCE ALBERT PULP CO. LTD.	PRINCE ALBERT, SASKATCHEWAN
6755	ONTARIO MINNESOTA PULP & PAPER	FORT FRANCIS, ONTARIO
6790	B.C. FOREST PRODUCTS	MACKENZIE, BRITISH COLUMBIA
6810	KAMLOOPS PULP & PAPER	KAMLOOPS, BRITISH COLUMBIA
6860	CARIBOO PULP & PAPER	QUESNEL, BRITISH COLUMBIA
6875	MIRIMICHI TIMBER	NEWCASTLE, NEW BRUNSWICK
7081	B.C. FOREST PRODUCTS	CROFTON, BRITISH COLUMBIA

NO. OF UNITS	CAPACITY B.D.W. TONS	PSI	TEMP. °F	YEAR
1	60	200	SAT.	1929
1	60	200	SAT.	1934
1	120	170	468	1937
1	120	570	700	1937
1	100	200	SAT.	1939
2	165	615	715	1944
1	175	175	SAT.	1946
1	175	175	SAT.	1947
1	80	570	700	1951
1	415	600	675	1954
1	250	870	825	1958
1	285	570	725	1959
1	235	300	SAT.	1960
1	790	625	750	1962
1	467	625	750	1962
1	790	625	725	1962
1	660	880	825	1963
1	455	570	725	1963
1	800	600	700	1963
1	350	625	750	1964
1	900	850	750	1964
1	1060	625	750	1964
1	670	900	850	1965
1	790	600	700	1965
1	770	625	750	1966
1	600	875	825	1970
1	750	625	750	1970
1	1500	715	750	1970
1	1000	625	750	1971
1	400	650	750	1971
1	800	625	750	1972

(Cont'd.)

APPENDIX 8A — *Recovery Boiler Reference List (Cont'd.)*

CONTRACT NO.	CUSTOMER	LOCATION
7105	AUSTRALIAN PAPER MANUFACTURERS	MARYVALE, AUSTRALIA
7375	PRINCE ALBERT PULP & PAPER	PRINCE ALBERT, SASKATCHEWAN
7380	POLIMEX-CEKOP	KWIDZYN, POLAND
7386	AMERICAN CAN	MARATHON, ONTARIO
7388	NIGERIAN NATIONAL PAPER	NIGERIA
7426	RUZOMBEROK PULP & PAPER	CZECHOSLOVAKIA
7441	CELULOSA PUERTO PIRAY S.A.	ARGENTINA
7457	MacMILLAN BLOEDEL LTD.	HARMAC, BRITISH COLUMBIA
7458	PRINCE GEORGE PULP & PAPER	PRINCE GEORGE, BRITISH COLUMBIA
7461	AUSTRALIAN PAPER MANUFACTURERS	MARYVALE, AUSTRALIA
7467	INDUSTRIES JAMES McLAREN LTD.	THURSO, QUEBEC

APPENDIX 8B

Babcock & Wilcox Canada

Towerpak Boiler Reference List

CONTRACT NO.	CUSTOMER	LOCATION
C-7080 **1973**	WELDWOOD OF CANADA	LONGLAC, ONTARIO
C-7146 **1973**	NEWAGO FOREST PRODUCTS	MEAD, HEARST, ONTARIO
C-7115 **1973**	ST. REGIS PAPER CO.	COSTIGAN, MAINE
C-7240 **1974**	ABITIBI PAPER CO.	WHITE RIVER, ONTARIO
C-7333 **1975**	PINKHAM LUMBER CO.	ASHLAND, MAINE
C-7390 **1977**	INTERSTATE PAPER CO.	RICEBORO, GEORGIA
C-7399 **1978**	INDUSTRIAS FORESTAL	ES SA (INFORSA) CHILE
C-7443 C-7446 **1979**	FF SOUCY INC.	RIVIERE DU LOUP, QUEBEC
C-7466 **1982**	NESTLE CO. LTD.	CHESTERVILLE, ONTARIO
C-7482 **1983**	N.E. ENERGY SERVICES FOR UNIVERSITY OF NEW BRUNSWICK	FREDERICTON, NEW BRUNSWICK
C-7502 **1984**	IPGD FOR FRITO LAY INC.	CHARLOTTE, NORTH CAROLINA
C-7533 **1985**	JEEP CORPORATION	TOLEDO, OHIO
C-7558 **1985**	PIZZAGALLI CONST. FOR SWIFT RIVER JVC	GREENVILLE, MAINE
C-7566 **1986**	THERMO ELECTRON FOR HEMPHILL POWER CO.	NEW HAMPSHIRE
C-7567 **1986**	THERMO ELECTRON FOR GORBELL POWER CO.	MAINE
C-7578 **1986**	THERMO ELECTRON FOR WHITEFIELD POWER	NEW HAMPSHIRE
C-7579 **1986**	COLORADO STATE HOSPITAL	PUEBLO, COLORADO
C-7592 **1986**	JEEP CORPORATION	TOLEDO, OHIO

NO. OF UNITS	CAPACITY B&W TONS	PSI	TEMP. °F	YEAR
1	500	915	825	1973
1	400	625	775	1975
1	900	940	825	1977
1	700	600	700	1977
1	500	928	842	1977
1	800	640	750	1979
1	800	1194	900	1979
1	1500	675	760	1980
1	350	600	700	1980
1	650	915	840	1981
1	428	450	705	1982

NO. OF UNITS	CAPACITY B&W TONS	OPERATING CONDITIONS	FUELS FIRED
1	40,000	300 PSI SATURATED	WOOD WASTE, NATURAL GAS
1	40,000	250 PSI SATURATED	WOOD WASTE, NO. 6 OIL
1	60,000	150 PSI SATURATED	WOOD WASTE, NO. 6 OIL
1	40,000	250 PSI SATURATED	WOOD WASTE, NO. 6 OIL
1	60,000	625 PSI 790°F	WOOD WASTE, NO. 6 OIL
1	60,000	650 PSI 750°F	WOOD WASTE, NO. 6 OIL, TAIL GAS
1	110,000	175 PSI SATURATED	WOOD WASTE, COAL, NO. 6 OIL
2	60,000	150 PSI SATURATED	WOOD WASTE, NO. 6 OIL
1	40,000	275 PSI SATURATED	COFFEE GROUNDS, NATURAL GAS, NO. 2 OIL
1	40,000	250 PSI SATURATED	WOOD WASTE
1	45,000	400 PSI SATURATED	COAL
1	70,000	150 PSI SATURATED	COAL
1	155,000	650 PSI 750°F	WOOD WASTE, NO. 2 OIL
1	140,700	900 900°F	WOOD WASTE
1	140,700	900 PSI 900°F	WOOD WASTE
1	140,700	900 PSI 900°F	WOOD WASTE
1	40,000	125 PSI SATURATED FUTURE 420 PSI 710°F	COAL
1	70,000	150 PSI SATURATED	COAL

APPENDIX 9

Babcock and Wilcox Company (U.S.A.)

A BRIEF HISTORY

The following history of the American company through 1924 is taken from *The Babcock and Wilcox Story 1867-1967*:

1867-1900

The growth of American technology – begun in the early 1800's with the use of steam power in transportation and manufacturing – went forward after the Civil War at a rate never before equalled.

By the middle of the 19th century in America, the use of steam power in mills and factories was general. The most common source of steam was the "shell" and later the "fire-tube" boiler. This early shell boiler was little more than a kettle filled with water and heated at the bottom, and the firetube had many of the shell type's disadvantages. The inefficiency, and often the dangers, of this type of steam generation had long been recognized. An alternate method, the "water-tube" boiler design, prompted work by many, seeking its greater efficiency and safety. Stephen Wilcox in 1856 proposed a major advance. His design incorporated inclined water-tubes connecting water spaces at the front and rear, with a steam space above, allowing better water circulation and more heating surface. Of even greater importance, he had developed a boiler which was inherently safe.

What the proponents of the water-tube principle had done was clear the way for the modern era of large high-pressure and high-temperature steam power plants. Tubes for water and steam are small and their thickness does not have to be excessive even at extremely high pressures. The boiler capacity is readily increased by making tubes longer and adding more of them. Drums can be held to reasonable dimensions and protected from excessive heat.

BABCOCK AND WILCOX BECOME PARTNERS IN POWER ENGINEERING

In 1867, the patent for the original Babcock & Wilcox boiler was granted to George Babcock and Stephen Wilcox, and the partnership of Babcock, Wilcox & Company was formed. The first boiler was built by the partners at the Hope Iron Works in Providence, Rhode Island, because they had no manufacturing facilities of their own. It was built to operate at 50 pounds pressure and 50 horsepower. Although this boiler was sold that year to Carpenter & Cross of Providence for Valley Worsted Mills, it was not until a year later that another boiler was sold – this one to Chase & Company in Pleasant Valley, Rhode Island. In time, however, the drive for higher capacity and safety created a continuing demand for B&W boilers.

ENERGY ON DISPLAY –
1876 CENTENNIAL EXPOSITION – PHILADELPHIA

It wasn't until 1876 at the Centennial Exposition in Philadelphia that the Babcock & Wilcox boiler came to national attention. The cost of exhibiting at the exposition was a serious matter to the young firm. Yet the two men put their faith in their product and built a boiler of full size and shipped it to the show.

The general public, only remotely aware of the great strides taken in mechanical invention, was awed by the size and power of the Corliss engine which weighed 600 tons and had cylinders 3 feet in diameter. They could hardly foresee that this great size was to spell the doom of the steam engine and that, with the introduction of more efficient prime movers, would add impetus to the further development of the B&W boiler, also among the momentous displays at Philadelphia. This 150-horsepower boiler would have been able, operating at the usual pressure of the day, 100 pounds, and with an engine of average efficiency, to supply electricity for about 16 modern homes.

During the next 10 years, development of the boiler continued with great vigor. Drums were substituted for the nest of cast iron tubes originally used for steam and water storage, and steel replaced cast iron for generating tubes. In about 1888, B&W improved drum construction by changing from wrought iron to steel plates.

It is an interesting coincidence that the birth of the electrical age in 1881 and the incorporation of The Babcock & Wilcox Company in New Jersey, with Babcock as president, occurred in the same year. From the first central stations in America – Philadelphia's Brush Electric Light Company Station and New York City's Pearl Street Station – the fortunes of B&W have been linked to the power field.

POWER PROMOTES THE GROWTH OF THE CITY

When Thomas A. Edison, in a white, high-crowned derby, ordered the switch thrown at the Pearl Street Central Station on September 4, 1882, he ushered in the "age of the cities." On that day, with four Babcock & Wilcox boilers generating steam energy for the manufacture of electricity, electric lighting became a practical reality.

The history-making station opened with 59 customers, using about 1,300 lamps. The Babcock & Wilcox boilers at the installation daily consumed five tons of coal and 11,500 gallons of water.

These boilers remained at the Pearl Street Station until 1894 where they were in constant use under very severe conditions. That year they were removed and put into service at the Edison 53rd Street Station, where they continued in service until 1902.

But there were other needs for electricity. As cities expanded in size, real estate values shot up. New engineering materials and the development of the elevator made it possible for higher buildings to be constructed. Electricity generated by steam took the man to his desk with the same facility that it lighted his work.

With the consolidation of business enterprises in the middle of cities, housing areas were pushed further and further toward the outskirts of population centers. The electric trolley, which had played a minor role in American life until this time, now entered more strongly upon the scene. And in hundreds of cities throughout the country the electric trolley clanged its way through vacant lots to create suburbia. A passenger, if he were so perversely inclined, could ride in electric trolleys all but 40 miles of the way from New York to Chicago. The trolley intensified demands for electricity for movement ... and central lighting stations matured into central electric power dispersing stations as the uses of electrical power broadened to encompass other phases of American life.

EUROPEAN EXPANSION

Coincident with B&W's entry in central power station development, steps were taken to expand abroad. In 1881, Nat W. Pratt, who was to become the Company's second president in 1893, went to Europe. He used his extensive knowledge of American sugar refining processes to sell B&W boilers to the process industries of Europe. The first boilers for foreign trade were made in the plant of the Singer Manufacturing Co. at Glasgow. Branch offices were successively opened in London, Paris and Brussels. The overseas boiler business grew rapidly, and in 1891 was sold to Babcock & Wilcox Limited, a British company organized to acquire this overseas business.

B&W BOILERS PROVIDE MORE EFFICIENT MARINE POWER

B&W contributions played an important role in establishing the ascendency of steam power in both the American Navy and merchant marine.

Participation in this nautical evolution was begun in 1875 with the installation of a marine boiler on the S.S. Monroe for the Quartermaster Department of the Army.

In 1889, a boiler was installed in Stephen Wilcox's steam yacht Reverie. This design received considerable and favorable attention and in 1896 was ordered for the United States naval vessels Marietta, Annapolis and Chicago, and many ships in England. These orders marked the beginning of B&W's leadership in this field.

These early successes culminated in the Alert design of 1899. In this installation, the firing end of the boiler was reversed, placing the firing door in what had been the rear wall of the boiler. The furnace was thereby enlarged in the direction in which combustion took place, leading to greatly improved combustion conditions.

In 1897 E. H. Bennett was elected the third B&W president. Following his death in 1898, he was succeeded by E. H. Wells, who was to hold the position for the next twenty-one years, guiding the Company in constructive growth and expansion in all phases of its operations.

1901-1920

ENERGY FOR AMERICA AS NEW WORLD POWER

At the turn of the century industrial accomplishments on a vast scale had placed the United States among the world powers. Now the wheels of American industry turned faster, improving our own standards of living, while supplying other countries. The increasing need for technical knowledge raised the number of students enrolled in colleges from 114,000 to nearly a quarter of a million between 1900 and 1914.

Aggressive expansion became the hallmark of American industry. And B&W, pioneering in its special field of steam generation, provided its boilers to the first public utility station to be equipped throughout with steam turbines; installed boilers in the power stations of the first New York subway; and introduced its then-advanced 350-pound pressure power boiler. It also undertook notable acquisitions and important diversifications. Until 1901, B&W boilers were built in the plant of the Singer Sewing Machine Co., but in 1901 the first B&W plant, the Bayonne Works, Bayonne, N.J., was put in operation.

Special equipment was installed at Bayonne for the manufacture of forged steel headers. These sinuous-shaped collecting headers at the ends of the tube rows provide a staggered tube arrangement, an important feature of B&W boiler design.

THE STEAM TURBINE – A NEW AVENUE TO ECONOMICAL POWER

Until 1900, further increase in steam pressures was restricted by the limitations of the reciprocating steam engine. With the increase in world trade and demands for more products, industry searched for an efficient alternative to reciprocating engines. Fortunately, the state of the art of steam generation was sufficiently advanced to be ready for the new power age introduced by the turbine.

The steam turbine rapidly gained importance as the major steam-powered source of rotary motion. It offered low-cost maintenance, greater overloading tolerance, fewer moving parts, and smaller size, which were only a few of the major advantages of the turbine over the reciprocating engine.

In 1902, B&W boilers were sold to supply steam for the first public utility plant to be equipped entirely with steam turbines – Fisk Street Station of Commonwealth Edison Co., Chicago. Eight 508-horsepower boilers, the largest built by B&W at the time, operating at 180 pounds pressure and a temperature of 530 degrees, powered each of the three 5000-kilowatt turbines first installed. The total electricity generated would supply about 40,000 modern homes. The station was a success and proved beyond a doubt the feasibility of large turbine units.

INTEREST ACQUIRED IN A. M. LOCKETT & COMPANY

In 1903, B&W acquired an interest in A. M. Lockett & Company, an engineering sales organization, for the purpose of furthering boiler sales in the South and Southwest.

STIRLING CONSOLIDATED BOILER COMPANY ACQUIRED – 1906

In 1906, five years after the opening of its Bayonne plant, B&W purchased the Stirling Consolidated Boiler Company, with its plant at Barberton, Ohio, occupying 65 acres. This acquisition initiated the production of B&W bent-tube boilers. This design had particular value in installations in low headroom conditions. The continuous and economical production of clean, dry steam, even when using poor feedwater, and the ability to meet sudden load swings also characterize the Stirling type boilers. By 1906, Stirling boilers had been built in sizes up to 823 horsepower and 300 pounds pressure, or 16 times more powerful than the B&W boiler of 1867.

The purchase of the Rust Boiler Company in 1909, and the consolidation of its facilities with those at Barberton, not only added to production capacity, but also augmented engineering talent and product designs.

BOILER PRODUCTION DEMANDS SPECIALIZED TUBING – PITTSBURGH SEAMLESS TUBE COMPANY ACQUIRED

The direction of boiler development had intensified B&W's search for new and more economical tubing. In particular, B&W desired a "hot-finished" seamless steel tube which would give good service and be stronger and more reliable, yet cost no more than the charcoal iron tubes they were then using. The Pittsburgh Seamless Tube Company, Beaver Falls, Pennsylvania, was acquired in 1904 to help solve the problem.

Boiler tubes required a relatively light wall thickness as compared with the available hot-finished tubes of the day, which had a fairly heavy wall and could only be made into light wall tubes by an unreasonable amount of subsequent rolling or cold drawing. The tube mill at the Beaver Falls plant was revamped, existing machinery rearranged, and additional equipment installed to adapt the plant to the manufacture of four-inch diameter hot-finished seamless steel boiler tubes with the required wall thickness. The operation was a success and the tubes were among the first commercial hot-finished seamless boiler tubes produced in the United States.

So it was from this period that B&W marks its participation in the tube industry – a participation which has built up logically and cumulatively into today's extensive operations.

For almost the first thirty years of its existence the tubing industry had little use for ally steels. Except for 3½ per cent nickel steel, which had been the major alloy used in bicycle construction in 1895, no other developments had been made beyond high-carbon and low-carbon steels. As a result of a constant search for improved tubing, in 1920, B&W began first experiments on the piercing of Monel metal in conjunction with the International Nickel Company.

During this period, improvements in operations led to extensive plant changes. The construction of a model laboratory and a patented continuous-type annealing furnace was undertaken as part of a program of scientific quality control and research into new markets for new products.

POWER PROGRESS IN A TIME OF CRISIS

The importance of earlier B&W marine boiler improvements were realized during World War I. The improved Alert type boiler – fitted with 4-inch tubes and equipped to burn oil – by then widely adopted in merchantmen and Great Lakes vessel service, went to war in the emergency fleet vessels. Likewise the weight and space advantages of the B&W three-drum boiler, first installed on the destroyer Mayrant in 1909, proved invaluable in powering Navy destroyer fleets of World War I. This crucial time saw the first mass production of boilers. The innovation of the B&W shop assembly technique, started in 1909, contributed greatly to production records in equipping naval and merchant ships during this pressing war period.

B&W boiler construction during the war was not limited to the maritime alone. B&W stationary boilers provided power for industries producing all types of war materials.

Research, too, went forward, solving problems in caustic embrittlement aggravated by higher pressures. It was during these years that economizers were first manufactured. An important aid in boiler efficiency, this development consists of a bundle of tubes located in the flue gas stream flowing from the boiler to the stack. Boiler feedwater passing through the economizer absorbs heat which would otherwise be wasted, before entering the boiler.

It was most fitting that in 1919, at the end of this World War I period, W. D. Hoxie, long associated with marine boiler development, was elected the fifth B&W president. He was to serve in this office until 1924.

1921-1929

ENERGY FOR NEW INDUSTRIAL GIANT

Too often the '20's are associated with dramatic but misleading symbols – the stock ticker, the rum runner and the raccoon coat. However, more enduring and significant developments took place in the realm of American industry. Of these, the ready availability of power was doubtlessly a major factor in sparking an unprecedented national prosperity. America was now using nearly as much electricity as the rest of the world put together. Her developing power resources were a tremendous factor in making possible American economic leadership: 61 per cent of all the telephones in the world were to be found in the United States; out of 27,500,000 automobiles in the world, 22,000,000 were American owned.

The growth of national power capacity to meet the various needs of industry stimulated the development of a range of boiler equipment, accessories and controls. B&W initiated its refractories production for the manufacture of heat-resisting materials and pushed forward its diversification program through affiliation with companies in different but related lines.

In 1924, A. G. Pratt, B&W's sixth president, assumed direction of the Company for a long and successful tenure lasting into 1948, when he was elected Chairman of the Board.

APPENDIX 10

Babcock and Wilcox, Limited (U.K.)

A BRIEF HISTORY

In 1984, Babcock International PLC (as the successor to the British Company is now known) celebrated the 100th anniversary of the opening of the London office. They marked the occasion with a publication entitled *The Changing World of Babcock International* which described the company's history, in part, as follows:

This year the Company celebrates the 100th anniversary of opening an office in London. Three years earlier, in 1881, the American founders had laid the roots of the British business in Scotland, the country of their ancestors, by opening an office in Glasgow.

HOW IT ALL BEGAN

But Babcock International's origins stretch back even further: its story begins in 1867 when two Americans, George Babcock and Stephen Wilcox, joined forces to design a safety boiler. They were awarded patents in 1873 for the "Babcock & Wilcox Non-Explosive Boiler" and the "Babcock & Wilcox Stationary Steam Engine". The principles developed by the New York based Babcock & Wilcox Company in those early days influenced the entire future development of water-tube boilers, and won for the Company a dominant position in boilermaking, a business upon which its growth and prosperity solely depended until the late 1960's.

A SUCCESSFUL STOCK EXCHANGE DEBUT

The Glasgow office was quick to establish itself as the springboard for expansion in Europe and throughout much of the world. Between 1884 and 1887 branches were opened in London, Manchester, Sydney, Paris, and Brussels. In 1891 Babcock & Wilcox Limited was incorporated with an initial capital of £240,000, and its shares made a successful debut on the London Stock Exchange in 1892. In 1898 companies were founded in France and Germany and a branch formed in Mexico. This rapid expansion soon produced the need for more capital. In 1900 the British company was reorganized and its capital enlarged from the original £240,000 to £630,000.

DRIVING DEEPER INTO WORLD MARKETS

Under an agreement made in 1891 with the American Babcock & Wilcox Company, the British company was permitted to operate anywhere in the world, except the United States and Cuba. Eager to enlarge further its sphere of operations, and its worldwide presence, new works or new companies were established in Japan, Spain, Australia, Canada, Mexico and Brazil between 1910 and 1936. Expansion continued after the Second World War, and by 1959 the Company had also formed companies in Belgium, South Africa, India, Portugal and New Zealand.

Throughout these years the Renfrew plant, first acquired in 1895, continued to expand. During the two World Wars the Renfrew engineering operations, now part of Babcock Power, played a vital role in supplying boilers for navy vessels, turrets and welded hulls for tanks, shells and rockets of all types, and aero-engine parts.

Today, Renfrew is one of the largest and best-equipped engineering plants in Europe, whose productivity record and work practices match the best in the world. And it is again applying its skills towards defence contracting work.

APPENDIX 11

Deutsche Babcock AG (GERMANY)

A BRIEF HISTORY

In a 1985 document entitled *From Boilermaking to Mechanical Engineering and Plant Construction*, Helmut Weihn, President and CEO of Deutsche Babcock AG described the history of his company, in part, as follows:

Berlin 1898: Here, representatives of the British company Babcock & Wilcox Ltd. met Robert Jurenka and Alois Seidl, two engineers who had emigrated from Bohemia. The two of them had founded an engineering office in Berlin which was at the same time the sales office for the British Babcock company. The British, very much interested in the markets of Central and Eastern Europe, soon reached agreement with the German partners at the talks. They founded "Deutsche Babcock & Wilcox Dampfkessel-Werke AG".

The aspiring industrial district on the Ruhr with its collieries, ironworks and manufacturing works was chosen as the location. The ideal conditions were found in the Schafersche Kesselfabrik (boiler works) in the Duisburger StraBe in Oberhausen. It was purchased and so just before the end of the century the joint history of Oberhausen and Babcock began.

The manufacturing range comprised, at the time of the founding of the company, water tube boilers, superheaters and mechanical firing systems. Two Americans, George Herman Babcock and Stephen Wilcox, had developed a steam generator, the "sectional boiler" which was built under licence in Britain and now also in Germany. It was more economical than the designs usual till then and, above all, it was explosion-proof, a fact which, by those day's standards, was by no means something that could be taken for granted.

Would this boiler withstand the high heating surface strains? The Prussian Technical Supervision Association which was responsible for steam boiler safety first of all doubted it. But then, and only slowly, they were convinced of the quality of the boiler and issued the required test certificate in 1899. Later one heard praise everywhere for the boiler which was produced "in our Babcock works" as the Oberhausen local historians Broermann and Seipp wrote.

In the book "Oberhausen – Man in his home town" which appeared in 1927 they described in detail the new Babcock boiler, which had ended the explosion danger:

"This 'Babcock boiler' avoids the dangerous, large water chambers with their riveted or welded joints. Instead it has several single chambers arranged side by side, with comparatively small cross-sections. These individual chambers are extremely resistant to high steam pressures. In addition they can be made in one piece, they therefore have neither the dangerous rivet joints nor welded joints. Both facts make the individual chamber explosion-proof. In fact, so far it has not yet happened that a 'Babcock boiler' exploded."

Babcock's economical and safe steam boilers reached world fame. At that time they were already easy to operate. In place of the previous plane grates, which had to be operated by hand, Babcock built "travelling grate stokers".

This automatic stoker consisted of a continuous belt of iron grate bars arranged behind one another and beside one another which, in continuous movement, conveyed the coal in the boiler furnace.

The boilers also had a long service life. How long, was shown by a Wuppertal factory in 1978 which ordered a water level indicator for a boiler supplied long before the First World War.

In front of the Oberhausen vocational schools centre in the road "Am Forderturm" stands, more or less as a memorial from the industrial pioneer days, one of the sectional chamber presses of those times. It remained in operation until the mid fifties.

Already under the President and Chief Executive Officer Dr. Robert Jurenka (died 1942) the manufacturing facilities on the Duisburger Strabe were constantly extended.

In 1899 Babcock employed 30 persons. In 1927 – almost three decades later – 1,350 persons worked in the Oberhausen works alone – in the boiler forge, the foundry, the pipe, valve and preheater factory. In the Gleiwitz works, acquired in 1909, 250 employees produced steam generators for the Upper Silesian industrial area. Then there were the fitters who were employed on the construction sites on which they erected not only the steam generators but also boilerhouses and chimneys.

Soon the company was one of the biggest employers in Oberhausen. But the space for the necessary capacity expansion was limited, on one side by Duisburger StraBe and on the other side by the railway line at the rear of the works site. Therefore as early as 1921, Babcock purchased a 1 million m^2 large plot of land – a former military training area – in Friedrichsfeld near Wesel.

After the Second World War, production facilities were set up there which were equipped on the basis of the latest technical know-how and constantly up-dated. In this manufacturing works numerous Oberhauseners are employed.

The economic recession after the First World War followed, then the partial destruction of the works plants in the Second World War. Reconstruction began with modest stocks of materials. In the initial post-war period, primarily agricultural machinery was repaired. Dr. Robert Jantscha, who had taken over the post of President and Chief Executive Officer of the company in 1942, deserves great praise for the reconstruction work carried out. The moving of the company's registered head office from Berlin to Oberhausen also took place during his period of office.

RANGE AND MARKET POSITION EXPANDED

Between the Babcock companies in the various countries it had been agreed which company was allowed to be active in which countries. In spite of some success in Poland and the Soviet Union, the German Babcock company's foreign business developed only sluggishly since West European countries and overseas markets could not be handled.

The erection sites on which the Oberhauseners employed by Babcock worked were, until long after the Second World War, above all in Germany itself and in East European countries.

The subsequent development of the Deutsche Babcock Group is closely associated with the name of Ewaldsen. Dipl. sc. pol. Hans L. Ewaldsen joined Babcock in 1951, was appointed to the post of Member of the Board dealing with commercial matters in 1960 and in 1967, after the death of Dr. Robert Jantscha, took on the position of President and Chief Executive Officer.

During his 23 years' service on the Managing Board and during his 16 years as President and Chief Executive Officer he restructured Babcock from a boilermaking company to a Group operating worldwide mainly in the areas of power engineering, environmental engineering and process engineering as well as special mechanical engineering.

APPENDIX 12

Babcock & Wilcox Canada

Outstanding Service Awards

In 1986, the Company instituted an Outstanding Service Awards program. These awards are given to individuals whose service to the Company has been of such a nature as to warrant very special recognition. The award itself consists of a boxed medallion suitably inscribed with the individual's name, the nature of the service performed, the date, and the serial number of the award.

Individuals whose service is considered for such an award generally fall into one of three categories:

1. Persons associated with a singular accomplishment or milestone, such as the successful conclusion of a major marketing campaign or the successful commissioning of a major unit.
2. Individuals whose extraordinary effort or achievement was realized over a period of time but which may or may not be clearly identifiable with a milestone, e.g. a major contribution to the growth or profitability of a product line.
3. Individuals who upon retirement have served over 40 years with the Company.

It is noted that in no cases are the awards to be considered ''automatic'' or ''routine''. In all cases, the nature of the service rendered must be truly unusual beyond that normally expected in such circumstances, and deserving of such recognition.

ACTUAL INSCRIPTION ON MEDAL	PRESENTED
No.: 001 **To:** ALFRED T. DUNCAN **For:** 41 YEARS OF LOYAL SERVICE **Date:** February 28, 1986	May 2, 1986 (Quarter Century Club dinner, Armenian Club, Cambridge)
No.: 002 **To:** PAUL P. KOENDERMAN **For:** LEADERSHIP OF CHINA ''S'' AND ''N'' **Date:** February 3, 1986	June 10, 1986 (Awards dinner at The Mill Restaurant, Cambridge)
No.: 003 **To:** IAN ANDERSON **For:** CONTRIBUTION TO CHINA ''S'' AND ''N'' MARKETING EFFORT **Date:** February 3, 1986	June 10, 1986 (Awards dinner at The Mill Restaurant, Cambridge)

ACTUAL INSCRIPTION ON MEDAL	PRESENTED
No.: 004 **To:** **ALEXANDER W. R. TOPLEY** **For:** CONTRIBUTION TO CHINA "S" AND "N" MARKETING EFFORT **Date:** February 3, 1986	June 10, 1986 (Awards dinner at The Mill Restaurant, Cambridge)
No.: 005 **To:** **FRANZ F. STEINMOELLER** **For:** CONTRIBUTION TO CHINA "S" AND "N" MARKETING EFFORT **Date:** February 3, 1986	June 10, 1986 (Awards dinner at The Mill Restaurant, Cambridge)
No.: 006 **To:** **VENKATRAMA KANNAN** **For:** CONTRIBUTION TO CHINA "S" AND "N" MARKETING EFFORT **Date:** February 3, 1986	June 10, 1986 (Awards dinner at The Mill Restaurant, Cambridge)
No.: 007 **To:** **WILLIS W. SPRING** **For:** 44 YEARS OF LOYAL SERVICE **Date:** April 30, 1987	April 14, 1987 (Retirement party, Continental Club, Cambridge)
No.: 008 **To:** **ROBERT E. DONOVAN** **For:** OUTSTANDING LEADERSHIP **Date:** 1984-1987	August 27, 1987 (Farewell party, Armenian Club, Cambridge) •

APPENDIX 13 (PART A)

Babcock & Wilcox Canada

Sales History by Product Line

1924 - FY 1987

$000

YEAR	BOILERS AND WATERWALLS	SH, AH ECON.	MISC. PRODUCTS	SERVICE, REPAIRS & PARTS	PURCHASED UNITS	PUMPS	ENGINES, TURBINES CONDENSOR	STOKERS
1924	373	—	243	37	—	119	11	—
1925	784	41	90	44	—	111	9	61
1926	777	85	80	55	—	196	3	83
1927	751	34	88	58	—	185	32	75
1928	427	14	95	50	—	161	8	60
1929	859	94	131	249	198	119	49	21
1930	629	144	74	191	276	139	27	33
1931	263	17	24	118	371	103	45	102
1932	141	14	26	82	126	85	20	26
1933	105	13	9	83	80	38	40	24
1934	160	6	92	128	107	75	26	79
1935	128	14	16	126	67	70	28	42
1936	269	42	34	174	154	107	43	78
1937	418	104	130	195	243	116	45	42
1938	578	104	68	215	353	84	51	99
1939	234	68	68	200	178	71	22	51
1940	496	73	293	335	135	102	57	83
1941	719	143	568	351	231	98	122	99
1942	988	46	988	500	323	101	503	90
1943	1,166	26	1,061	396	346	52	690	42
1944	1,411	108	895	537	572	47	757	84
1945	367	42	118	471	208	67	237	23
1946	875	159	173	500	289	54	102	121
1947	637	115	43	568	320	88	63	168
1948	1,370	175	64	602	313	70	81	338
1949	1,377	236	55	716	757	64	86	392
1950	1,300	359	29	628	932	51	51	319
1951	2,031	385	19	824	1,795	97	45	207
1952	3,591	932	13	934	2,042	79	28	310
1953	4,953	1,694	—	1,148	2,092	105	59	411
1954	2,220	425	—	999	1,567	41	28	438
1955	2,080	454	—	1,028	1,317	33	18	241
1956	1,754	564	213	1,231	968	45	8	177
1957	2,348	658	88	1,179	1,812	89	29	259
1958	3,389	2,248	70	1,106	2,255	161	14	169
1959	3,275	1,496	56	1,158	3,273	195	77	269
1960	2,301	2,155	987	1,198	1,510	725	77	96
1961	2,624	2,100	418	1,235	3,044	996	57	113
1962	2,632	836	855	1,861	2,587	453	25	257

R. ENT	SS DUCTS TANKS & OIL BURNERS	AIR COMPRESS.	PLANT ERECTION	NAVY	RADIANT	STIRLING	RECOVERY	PFI PFT In	PACKAGE	NUCLEAR	TOTAL
—	—	—	—	—	—	—	—	—	—	—	783
—	—	—	—	—	—	—	—	—	—	—	1,140
—	—	—	—	—	—	—	—	—	—	—	1,279
—	—	—	—	—	—	—	—	—	—	—	1,223
—	—	—	—	—	—	—	—	—	—	—	815
129	—	13	104	—	—	—	—	—	—	—	1,966
208	—	38	130	—	—	—	—	—	—	—	1,920
2	—	7	52	—	—	—	—	—	—	—	1,104
8	—	—	30	—	—	—	—	—	—	—	558
—	—	—	16	—	—	—	—	—	—	—	408
1	—	39	20	—	—	—	—	—	—	—	733
12	—	43	28	—	—	—	—	—	—	—	574
92	—	47	30	—	—	—	—	—	—	—	1,070
165	—	77	45	—	—	—	—	—	—	—	1,580
115	—	99	137	—	—	—	—	—	—	—	1,903
17	—	40	26	—	—	—	—	—	—	—	975
42	—	62	93	—	—	—	—	—	—	—	1,771
21	—	21	92	—	—	—	—	—	—	—	2,465
68	—	1	146	—	—	—	—	—	—	—	3,754
54	—	14	41	—	—	—	—	—	—	—	3,888
257	—	6	307	—	—	—	—	—	—	—	4,981
51	—	—	105	—	—	—	—	—	—	—	1,689
41	111	18	132	—	—	—	—	—	—	—	2,575
—	86	80	212	—	—	—	—	—	—	—	2,380
133	175	2	224	—	—	—	—	—	—	—	3,547
67	238	25	401	—	—	—	—	—	—	—	4,414
332	335	—	376	—	—	—	—	—	—	—	4,712
561	512	9	179	—	—	—	—	—	—	—	6,664
794	664	4	1,314	—	—	—	—	—	—	—	10,705
923	991	17	1,546	—	—	—	—	—	—	—	13,939
128	412	—	1,220	—	—	—	—	—	—	—	7,478
279	600	—	1,132	—	—	—	—	—	—	—	7,182
125	733	—	1,261	659	—	—	—	—	—	—	7,736
352	652	—	1,224	526	—	—	—	—	—	—	9,216
603	1,809	—	1,989	332	—	—	—	—	—	—	14,145
1,011	1,681	—	611	176	—	—	—	—	—	—	13,278
563	1,122	—	2,291	1,933	—	—	—	—	—	—	14,958
458	665	—	2,362	973	—	—	—	—	—	—	15,045
179	990	—	1,568	303	—	—	—	—	—	—	12,546

(Cont'd.)

APPENDIX 13 (PART A) *Sales History By Product Line (cont'd)*

YEAR	BOILERS AND WATERWALLS	SH, AH ECON.	MISC. PRODUCTS	SERVICE, REPAIRS & PARTS	PURCHASED UNITS	PUMPS	ENGINES, TURBINES CONDENSOR	STOKERS
1963	2,258	737	2,274	1,961	2,159	494	—	73
1964	2,483	810	2,565	2,170	2,505	550	—	80
1965	4,930	3,654	2,731	2,030	3,689	920	—	82
1966	6,019	3,838	2,357	2,516	5,679	747	—	13
1967	5,621	3,293	4,590	2,935	3,556	963	—	8
1968	5,148	1,992	4,375	3,422	4,037	1,125	—	19
1969	4,188	2,259	4,598	4,380	3,521	1,278	—	—
1970	—	—	4,915	5,956	—	1,313	—	—
1971	—	—	715	7,036	—	1,656	—	—
1972	—	—	2,218	8,518	—	1,863	—	—
1973	—	—	2,369	11,337	—	2,156	—	—
1974	—	—	1,108	11,851	—	1,254	—	—
1975	—	—	3,616	17,018	—	1,436	—	—
1976	—	—	2,388	19,826	—	1,846	—	—
1977	—	—	674	22,052	—	3,594	—	—
FY **1979**	—	—	2,406	28,494	—	4,864	—	—
FY **1980**	—	—	478	26,215	—	—	—	—
FY **1981**	—	—	163	27,726	—	—	—	—
FY **1982**	—	—	119	32,610	—	—	—	—
FY **1983**	—	—	—	31,130	—	—	—	—
FY **1984**	—	—	148	44,216	—	—	—	—
FY **1985**	—	—	—	48,718	—	—	—	—
FY **1986**	—	—	—	46,976	—	—	—	—
FY **1987**	—	—	—	45,126	—	—	—	—

[illegible]	SS, DUCTS TANKS & OIL BURNERS	AIR COMPRESS.	PLANT ERECTION	NAVY	RADIANT	STIRLING	RECOVERY	PFI, PFT IR	PACKAGE	NUCLEAR	TOTAL
[illegible]	1,041	—	2,367	91	—	—	—	—	—	—	**13,753**
34	1,150	—	2,548	100	—	—	—	—	—	—	**15,195**
72	2,922	—	2,688	126	—	—	—	—	—	—	**24,544**
59	3,530	—	6,148	11	—	—	—	—	—	—	**31,517**
99	1,517	—	3,420	—	—	—	—	—	—	—	**26,602**
01	1,622	—	2,599	—	—	—	—	—	—	—	**24,840**
16	1,147	—	3,931	—	—	—	—	—	—	—	**25,318**
—	—	—	4,340	—	11,171	1,486	976	465	3,222	2,156	**36,000**
—	—	—	10,508	—	24,371	658	6,379	2,199	1,432	1,634	**56,588**
—	—	—	11,852	—	19,935	3,060	2,018	1,170	1,874	5,406	**57,914**
—	—	—	9,406	—	22,791	530	2,613	136	3,221	6,105	**60,664**
—	—	—	12,678	—	27,609	273	1,952	9	2,746	4,724	**64,204**
—	—	—	26,822	—	36,102	813	415	3,330	4,702	8,289	**102,543**
—	—	—	33,301	—	42,047	2,504	5,335	4,491	3,556	14,234	**129,528**
—	—	—	23,805	—	39,883	2,810	17,399	6,402	2,787	19,305	**138,711**
—	—	—	14,457	—	30,400	5,591	6,792	2,179	2,848	13,942	**111,973**
—	—	—	6,559	—	32,111	3,824	6,151	181	4,435	11,039	**90,993**
—	—	—	4,425	—	18,996	641	7,429	910	8,560	14,311	**83,161**
—	—	—	13,267	—	35,971	36	9,732	440	1,787	22,417	**116,379**
—	—	—	16,349	—	53,822	3,959	12,978	—	2,920	40,964	**162,122**
—	—	—	16,001	—	20,873	4,106	1,859	—	1,219	26,703	**115,125**
—	—	—	4,042	—	3,885	2,134	2,498	—	565	29,609	**91,451**
—	—	—	4,657	—	23,659	9,427	2,567	—	2,404	38,445	**128,135**
—	—	—	9,083	—	104,411	5,750	24,827	—	4,841	17,607	**211,645**

APPENDIX 13 (PART B)

Sales & Net Income

1908 - FY 1987

$000

YEAR	SALES	NET INCOME	YEAR	SALES	NET INCOME
1908	583	31	**1948**	3,547	281
1909	654	36	**1949**	4,414	355
1910	654	41	**1950**	4,712	428
1911	723	76	**1951**	6,664	312
1912	716	39	**1952**	10,705	563
1913	707	55	**1953**	13,939	1,044
1914	509	35	**1954**	7,478	451
1915	1,531	412	**1955**	7,182	166
1916	1,907	291	**1956**	7,738	73
1917	2,230	—	**1957**	9,216	294
1918	2,085	—	**1958**	14,145	728
1919	1,545	—	**1959**	13,278	423
1920	2,260	—	**1960**	14,958	534
1921	1,545	—	**1961**	15,045	953
1922	—	—	**1962**	12,546	262
1923	—	—	**1963**	13,753	121
1924	783	—	**1964**	15,195	622
1925	1,140	—	**1965**	24,544	1,075
1926	1,279	(8)	**1966**	31,517	849
1927	1,223	(63)	**1967**	26,602	1,203
1928	815	(202)	**1968**	24,840	1,082
1929	1,966	56	**1969**	25,318	420
1930	1,920	71	**1970**	36,000	216
1931	1,104	(191)	**1971**	56,588	937
1932	558	(249)	**1972**	57,914	1,072
1933	408	(198)	**1973**	60,664	1,307
1934	733	(109)	**1974**	64,204	(448)
1935	574	(129)	**1975**	102,543	(2,472)
1936	1,070	(14)	**1976**	129,528	950
1937	1,580	62	**1977**	138,711	(1,301)
1938	1,903	(9)	—	—	—
1939	975	(97)	—	—	—
1940	1,771	16	—	—	—
1941	2,465	38	—	—	—
1942	3,754	85	—	—	—
1943	3,888	49	—	—	—
1944	4,981	53	—	—	—
1945	1,689	(5)	—	—	—
1946	2,575	98	—	—	—
1947	2,380	144	—	—	—

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